



OHM Remediation
Services Corp.
A Subsidiary of OHM Corporation

**CONTRACTOR CLOSEOUT REPORT
VOLUME 1
SAMPLING, ANALYTICAL, AND TESTING REPORT
REMOVAL ACTION
NAVAL TRAINING CENTER - BAINBRIDGE
PORT DEPOSIT, MARYLAND**

Prepared for:

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LIST OF ACRONYMS

AEN	American Environmental Network, Inc.
ASC	Analytical Services Corp.
AST	Aboveground Storage Tank
bgs	Below Ground Surface
BOD	Biochemical Oxygen Demand
BTEX	Benzene, Toluene, Ethylbenzene, and Xylene
CLP	Contract Laboratory Program
COD	Chemical Oxygen Demand
CQA	Construction Quality Assurance
CQAP	Construction Quality Assurance Plan
CSAP	Confirmation Sampling and Analysis Plan
DDD	4,4'-DDD
DDE	4,4'-DDE
DDT	4,4'-DDT
E&E	Ecology and Environment, Inc.
EFA-Chesapeake	Engineering Field Activity - Chesapeake
F.A.R.	Federal Acquisition Regulations
FSAP	Field Sampling and Analytical Plan
FWA Geosciences	FWA Geosciences, Inc.
Geosynthetics CQA Plan	Independent Geosynthetics Construction Quality Assurance and Operations Plans
HDPE	High-Density Polyethylene
HVOCs	Halogenated Volatile Organic Compounds
I-Corp	I-Corp International, Inc.

LIST OF ACRONYMS (CONTINUED)

MDE	Maryland Department of the Environment
MDL	Minimum Detection Limit
mg/kg	Milligrams Per Kilogram
mg/L	Milligrams Per Liter
Myers	Myers Analytical Laboratories, Inc.
MS/SD	Matrix Spike/Spike Duplicate
NEESA	Naval Energy and Environmental Support Activity
NFESC	Naval Engineering Facilities Support Command
NTCB	Naval Training Center - Bainbridge
OHM	OHM Remediation Services Corp.
PAHs	Polynuclear Aromatic Compounds
PCBs	Polychlorinated Biphenyls
PHCs	Petroleum Hydrocarbons
PID	Photoionization Detector
ppb	Parts Per Billion
ppm	Parts Per Million
QA	Quality Assurance
QC	Quality Control
QA/QC	Quality Assurance/Quality Control
RAC	Remedial Action Contract
RCRA	Resource Conservation and Recovery Act
RPDs	Relative Percent Differences
RT	Retention Time
Solmax	Solmax Geosynthetics, Inc.
SVOCs	Semivolatile organic compounds
TAL	Target Analyte List

LIST OF ACRONYMS (CONTINUED)

TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TCMX	Tetrachloro-m-xylene
TDS	Total Dissolved Solids
TPH	Total Petroleum Hydrocarbons
TPH-GC	Total Petroleum Hydrocarbons by Gas Chromatograph
TPH-IR	Total Petroleum Hydrocarbons by Infrared Spectrometer
TRI	TRI/Environmental, Inc.
TSS	Total Suspended Solids
TVS	Total Volatile Solids
USEPA	United States Environmental Protection Agency
USTs	Underground Storage Tanks
VOCs	Volatile Organic Compounds
µg/kg	Micrograms Per Kilogram
%R	Percent Recoveries

EXECUTIVE SUMMARY

OHM Remediation Services Corp. (OHM), a wholly-owned subsidiary of OHM Corporation, was contracted by the Navy, via LANTDIV RAC Contract No. N62470-93-D-3032 (Delivery Order 014) on 29 March 1994, to perform a removal action at Naval Training Center - Bainbridge (NTCB). Volume 1 of the Contractor Closeout Report presents the sampling methods and analytical results associated with the removal action and quality control (QC). Volume 2 documents the construction operations for the removal action. The methods and results of independent third-party quality assurance (QA) testing for the Site 1 Old Landfill Cap geosynthetics installation are provided in Volume 3.

Site 1 - Old Landfill Area

At the Old Landfill Area (Site 1), a subsurface investigation consisting of over 160 test pits established the approximate limits of construction debris and landfill material outside the design perimeter of the future landfill cap to the satisfaction of the Maryland Department of the Environment (MDE). Over 20 soil and liquid samples were collected at Site 1 and analyzed at an off-site testing laboratory to characterize environmental conditions and measure effectiveness of the removal actions.

Samples of intermittent seeps on the northern side contained low but detectable levels of dieldrin (pesticide), acetone (common laboratory cleaning agent), and various metals. Post-excavation soil samples (collected after the removal and relocation of construction debris and landfill material from northwest of the future landfill cap) were found to contain low but detectable levels of six pesticides, three volatile organic compounds (VOCs), and various metals.

Materials imported for construction purposes were within specifications and were not chemically contaminated based on physical and chemical laboratory testing. Vegetative debris and non-hazardous waste materials from remedial activities were sampled and analyzed prior to off-site disposal.

Construction quality control (CQC) data indicated that landfill cap materials, both soils and geosynthetics, were installed satisfactorily. The final cover layer satisfied the specified compaction criteria. Geosynthetics for the landfill cap were tested at an off-site laboratory for conformance with manufacturer and project specifications, and were determined to be acceptable. Geomembrane field seams were subjected to non-destructive and destructive testing and were acceptable.

Site 2 - Firefighter Training Area

At the Firefighter Training Area (Site 2), 83 investigative soil samples were analyzed in the laboratory and over 200 investigative samples were screened in the field to delineate the extent of soils contaminated by petroleum hydrocarbons (PHCs) or pesticides. Soils were removed to the delineated limits of contamination or to the practical limits of excavation (e.g., bedrock or groundwater). Paint filter test results were acceptable for materials being solidified prior to their transport to Site 1 for placement below the landfill cap.

EXECUTIVE SUMMARY (CONTINUED)

Over 165 post-excavation soil samples were analyzed in the laboratory and confirmed that soil remediation goals set forth by the MDE and Engineering Field Activity - Chesapeake (EFA-Chesapeake) had been achieved for petroleum hydrocarbon and pesticide contamination encountered in the following areas:

- Twelve locations of former underground tanks, aboveground tanks, and vaults
- Oil/water separator pit floor and containment berms
- Oil/water separator pit inflow and outflow swales
- Two abandoned groundwater monitoring well locations
- Forested wetland north of the oil/water separator pit.

Over 45 water samples were analyzed in the laboratory to characterize excavation pit waters and to verify water treatment effectiveness. Water treated on site was confirmed as being treated to the satisfaction of the MDE and EFA-Chesapeake prior to use as a dust control agent on NTCB.

Wetland Mitigation Area

Since the Wetland Mitigation Area did not constitute an environmental area of concern, investigative and confirmation sampling was not necessary, and only material testing of imported compost was performed. The results were acceptable for the compost.

1.0 INTRODUCTION

1.1 PURPOSE OF DOCUMENT

OHM Remediation Services Corp. (OHM), a wholly owned subsidiary of OHM Corporation, has been contracted by the Department of the Navy, Atlantic Division (Contract No. N62470-93-D-3032; Delivery Order No. 0014), to remove impacted on-site soils, sediment, earthen fill, and landfill materials located at Naval Training Center - Bainbridge (NTCB), Maryland. The impacted soils and other materials were then placed within a former on-site landfill which was subsequently capped by OHM. OHM established and implemented a sampling and analysis program to delineate and confirm the removal of impacted soils and other materials. OHM conducted additional sampling, laboratory analysis, and quality assurance (QA) testing in conjunction with site remediation and construction activities.

The purpose of this document is to describe the methods and results of sampling and QA testing performed by OHM at NTCB between July 1994 and June 1995. Laboratory analytical and field test results provided in this volume pertain to environmental investigation, post-excavation sampling, and construction QA. Sampling and QA plans are provided in the Volume 1 appendices. In many instances, field conditions necessitated modifications to the sampling and/or testing approach described in the guidance documents, plans, or specifications.

1.2 PROJECT BACKGROUND

From July 1994 through April 1995, OHM arranged for analytical testing of various environmental media, primarily soils and liquids, sampled from potentially impacted areas located at the Old Landfill Area (Site 1) and at the former Firefighter Training Area (Site 2) at NTCB. The locations of Sites 1 and 2 within NTCB are shown on Figure 1. The objectives of the sampling and analytical effort were as follows:

- Assess and identify potential areas of concern
- Delineate and characterize impacted areas prior to remediation
- Confirm that impacted areas have been remediated to established standards
- Screen materials imported to the site for potential hazardous substances
- Characterize potentially impacted materials for off-site disposal.

Investigative and post-excavation sample locations at Sites 1 and 2 are shown on the accompanying figures.

Analytical Services Corp. (ASC) of Findlay, Ohio performed analytical testing from the beginning of sampling activities in July 1994 through November 1994. A second laboratory, American Environmental Network, Inc. (AEN) of Columbia, Maryland, was awarded a second phase of analytical testing beginning in November 1994. The transition from ASC and AEN took place during the last week of November 1994. However, ASC was periodically retained after this transition for additional analyses of limited scope and duration. Analytical data provided by ASC and AEN through June 1995 is discussed in this report and summarized in the accompanying Analytical Data Summary tables.

1.3 REGULATORY ISSUES

The Waste Management Administration of the Maryland Department of the Environment (MDE) provided guidance with respect to applicable state regulations. Maryland environmental clean-up criteria were used to establish the clean-up goals for the removal action at Site 2. Concentrations for residential soil provided

in the United States Environmental Protection Agency (USEPA) Risk-Based Concentration Table, First Quarter 1994, were used to establish cleanup goals for pesticide compounds at Site 2. Applicable cleanup goals are as follows:

<i>Site/Area</i>	<i>Compound</i>	<i>Cleanup Goals</i>	<i>Standard</i>	<i>Provided By</i>
Site 2/Firefighter Training Pad	PHC	100 mg/kg	MDE	Mr. Ed Carlson - MDE
Site 2/Separator Pit and Vicinity	PHC	100 mg/kg	MDE	Mr. Ed Carlson - MDE
Site 2/Separator Pit Outflow Swale	PHC	100 mg/kg	MDE	Mr. Ed Carlson
	DDD	2.7 mg/kg	USEPA(1)	EFA-Chesapeake
	DDE	1.9 mg/kg	USEPA(1)	EFA-Chesapeake
	DDT	1.9 mg/kg	USEPA(1)	EFA-Chesapeake
Site 2/Forested Wetland	DDD	2.7 mg/kg	USEPA(1)	EFA-Chesapeake
	DDE	1.9 mg/kg	USEPA(1)	EFA-Chesapeake
	DDT	1.9 mg/kg	USEPA(1)	EFA-Chesapeake

(1) USEPA Risk-Based Concentration Table, First Quarter 1994; Residential Soil Standards.

Prior to collection of post-excavation samples at Sites 1 and 2, a confirmation sampling and analysis plan was submitted to the MDE and Engineering Field Activity - Chesapeake (EFA-Chesapeake) for review and comment prior to implementation. The quantities and locations of post-excavation samples to be collected, and the analyses to be performed for each area, were specified in the plan document.

1.4 SITE DESCRIPTION

1.4.1 Site 1 - Old Landfill Area

Since the training facility's inception in 1942, the Old Landfill at Site 1 was used for disposal of sanitary wastes generated from daily operations. A report from a 1968 Pest Control Program Review recommended that unusable pesticides be disposed by burial in the landfill and that the containers be punctured and/or crushed to prevent reuse. Discussions with past employees indicate that such pesticide disposals did take place in the late 1960s and/or early 1970s.

Pesticides in solid dry form were reported to have been buried at a depth of approximately 3 feet, while liquid pesticides were poured into excavated pits approximately 30 inches deep. Empty pesticide containers were punched with holes and buried along with their former contents to prevent further use.

In the early 1980s, approximately 50 buildings were demolished to make room for a United States Department of Labor job training center (Job Corps). Building components which had some salvage value (such as metal pipes, heating system components, or heavy beams) were removed. The remainder of the structures were demolished, and the rubble was transported to the north end of the Old Landfill and placed on the surface; only minimal soil coverage and compaction were provided for this newly placed rubble.

Site 1 consists of the original base landfill and the general area surrounding the Old Landfill, as shown on Figure 2. Prior to site clearing by OHM, most of the Old Landfill and the surrounding area was densely wooded. The Old Landfill Area is bounded by an intermittent drainage and wetlands to the north and west. Maryland Highway 276 is located to the northwest. A former drill field east of the Old Landfill was used by OHM to locate the construction office, and for staging of equipment and materials. The area east of the Old



Landfill was developed by OHM for construction borrow. The wetlands and stream system northwest of the landfill were restored following the discovery and removal of landfill material located beyond the future landfill cap limits.

Prior to landfill regrading by OHM, a large ravine separated the landfill into eastern and western landfill sections. The ravine, which originated near the center of the landfill, increased to a depth of approximately 16 feet where it opened into the northwest drainage (Figure 2). Groundwater seeps were evident at several locations near the northern and western limits of the landfill.

Several trenches, which may have been used during base operation as liquid disposal pits, were located within the limits of the future landfill cap. The northern "finger" pit was situated at the toe of the landfill ravine, adjacent to an intermittent stream north of the landfill. The northern pit measured approximately 20 feet wide and 80 feet in length. Three additional "finger" pits were located in close proximity to each other within the western section of the landfill. The pits each measured approximately 50 feet long and 15 feet wide, and were generally oriented northeast to southwest.

1.4.2 Site 2 - Firefighter Training Area

Site 2 consisted of a 400-foot-square concrete pad, formerly used for conducting firefighter training exercises when NTCB was an active facility. Underground storage tanks (USTs), removed under a separate contract prior to Site 2 remediation by OHM, were formerly located at various locations within the limits of the firefighter training pad. OHM excavated each former tank location, removed impacted soils as necessary to achieve MDE clean-up levels, and collected post-excavation samples for laboratory analysis.

Three shell buildings, composed of reinforced concrete and masonry bricks and located on the southern portion of the firefighter training pad, were demolished by OHM during site remediation activities. During firefighter training exercises, the inner compartments of the three buildings were doused with fuel oil and then set ablaze. Water and fuel oil not consumed in the fire were collected in two concrete oil/water separator vaults located below ground, approximately 30 feet south of the easternmost firefighter training building, designated Building C on an exterior wall.

Water and fuel oil not collected in the concrete vaults were discharged into a 175-foot-square, clay-lined separator pit located southeast of the firefighter training pad. Fuel oil residue collected as a 1- to 2-foot-thick sludge layer on the floor of the separator pit. A thin layer of sediment and organic material eventually covered the accumulated fuel oil, and thick vegetation composed primarily of *Phragmites* became established throughout the floor of the separator pit. An outlet structure, located in the southernmost corner of the separator pit, controlled the discharge of water from the separator pit into a 180-foot-long drainage swale, which in turn discharged into the Happy Valley Branch, a small tributary (less than 1 square mile drainage area) of the Susquehanna River.

Pesticides, primarily 4,4'-DDT (DDT), 4,4'-DDE (DDE), and 4,4'-DDD (DDD), were detected in soil and sediment samples collected from a wooded wetland area located immediately east of the firefighter training pad and immediately north of the separator pit. At least one spring and several shallow drainage swales were located within the pesticide-impacted wetland.

The former base sewage treatment plant occupies an area to the south-southwest of the Firefighter Training Area. An OHM water treatment system was operated within the remains of drying beds associated with the sewage treatment plant during separator pit dewatering activities.

1.4.3 Wetland Mitigation Area

The Wetland Mitigation Area was established to offset the permanent loss of wetlands at Site 1. The new wetlands were constructed in an area between the former potable water treatment building and the NTCB reservoir. The Wetland Mitigation Area was established to mitigate the permanent loss of wetlands located at Site 1, northwest of the constructed landfill cap. Prior to clearing and regrading, the site was composed of mostly grassy vegetation and some small trees, and was underlain by a network of water lines associated with the potable water treatment building.

1.5 SCOPE OF WORK

1.5.1 Site 1 - Old Landfill Area

Sediment and soil samples were collected at Site 1 to verify that materials within and adjacent to the Old Landfill were non-hazardous. In addition, water samples were collected from two seeps, located west (Seep A) and northwest (Seep B) of the landfill, to determine if the water was hazardous.

The following locations at Site 1 were sampled between 1 July 1994 and 15 June 1995:

- Test Pit TP-20 advanced during landfill limit delineation
- Seeps A and B
- Northern liquid disposal (finger) pit
- Southern liquid disposal (finger) pits.

All OHM sampling locations at Site 1 are indicated on Figure 3.

1.5.2 Site 2 - Firefighter Training Area

Investigative sampling of solids and liquids at Site 2 was performed within the oil separator pit area and adjacent wetlands. Soil and groundwater in the Firefighter Training Area and oil separator pit were impacted by petroleum hydrocarbons (PHCs). The surface soil and sediment in the wetland area northeast of the Firefighter Training Area were impacted by pesticides, primarily DDT and its metabolites, DDE and DDD.

Analytical data is presented in this volume for investigative samples collected from the following areas and locations at Site 2 as shown on Figure 4:

- Areas A and B--Surrounding monitoring wells 2-GW-6 and 2-GW-8, respectively
- Area C--Separator pit stormwater inflow swale
- Area D--Separator pit floor and surrounding containment berms
- Area E--Separator pit outflow swale
- Area F--Firefighter training pad
- Area H--Pesticide-impacted wetland north of the separator pit.

Post-excavation sampling was performed in all areas at Site 2 where OHM conducted soil removal actions. Post-excavation sample locations are shown on Figure 5. Analytical data is presented in this volume for post-excavation samples collected from the following areas at Site 2:

- Area D--Separator pit floor and surrounding containment berms
- Area E--Separator pit outflow swale and discharge headwall/berm
- Area F--Firefighter training pad



- Area H--Pesticide-impacted wetland north of the separator pit
- Former underground storage tank locations in the firefighter training pad area
- Former locations of concrete separator vaults.

In addition, influent and effluent samples were collected and analyzed during the operation of the temporary water treatment system at Site 2. The water treatment system was demobilized from NTCB on 20 December 1994.

1.5.3 Wetland Mitigation Area

Since the Wetland Mitigation Area was not undergoing environmental remediation, the sampling of soil, groundwater, or surface water was not necessary. Compost imported from off site was sampled and analyzed to verify that contamination was not present.

2.0 SITE 1 SAMPLING AND ANALYSIS

2.1 SAMPLING PLAN AND QUALITY CONTROL

Field sampling, laboratory testing, and associated quality control (QC) for Site 1 were based on the following:

- Construction specifications designed by Ecology and Environment, Inc., (E&E) dated March 1994 and revised by E&E in June 1994
- OHM Field Sampling and Analytical Plan (FSAP) dated 18 May 1994
- OHM Confirmation Sampling and Analysis Plan (CSAP) dated 10 March 1995.

Because the FSAP and E&E specifications primarily addressed sampling and analysis activities at Site 2, the CSAP was prepared by OHM prior to excavation of landfill material in March 1995 and incorporated requirements specified by EFA-Chesapeake and MDE. Additional sampling and analysis, not included in the FSAP, CSAP, or specifications, were planned and implemented as a result of unanticipated site conditions.

2.1.1 Sampling Plan Modifications

On 21 July 1994, EFA-Chesapeake authorized collection and analysis of gray fine-grained sediment encountered in Test Pit No. 020. Proposed analyses of the grab sample were to include total nitrates and Resource Conservation and Recovery Act (RCRA) Toxicity Characteristic Leaching Procedure (TCLP) metals. The analyses were intended to assess whether the sediment may be flyash or material associated with the sewage treatment plant located at Site 2. Test Pit No. 020 was one of many test pits advanced near the Maryland Highway 276 fenceline to delineate the limit of landfill material.

On 8 August 1994, OHM initiated planning for aqueous sample collection at Seeps A and B. The seep samples were collected to characterize seep discharge prior to possible collection and off-site disposal. The minimum required analytical parameters for the two seep samples were specified by the disposal facilities as a condition for facility acceptance and disposal pricing.

On 7 October 1994, OHM received authorization from EFA-Chesapeake to collect a composite sediment sample from the three southern finger pits and a composite sediment sample from the northern finger pit located at the toe of the Old Landfill ravine. All four finger pits were suspected of having been used for waste liquid disposal when NTCB was an active facility.

For the composite sample from the southern finger pits, sediment collection was biased toward black staining in the middle and westernmost of the three pits. For the composite sample from the northern finger pit, sediment collection was biased toward black viscous material and indications of sediment staining. EFA-Chesapeake requested analysis for RCRA characteristics and full RCRA TCLP to determine if the pits contained hazardous waste as defined by RCRA requirements.

During March 1995, EFA-Chesapeake authorized collection of a composite sample from each of two vegetative debris piles staged on the Site 1 drill field. The two samples were analyzed for standard disposal characterization parameters: full RCRA TCLP, RCRA characteristics, total petroleum hydrocarbons (TPH), and polychlorinated biphenyls (PCBs).

2.1.2 Confirmation Sampling and Analysis Plan

The approach presented in the CSAP was developed to assess whether hazardous materials were present following removal of landfill material located beyond the limit of the future landfill cap. Analytical data from the post-excavation sampling may be used to prepare a risk assessment of the area northwest of the landfill cap following restoration.

2.1.3 Sampling and Analysis of Imported Materials

As indicated in the FSAP and the project specifications, imported materials were required to be sampled and analyzed prior to importation and use on site for construction and other applications. The purpose of the sampling was to verify that materials designated for use on site were not contaminated prior to importation.

2.1.4 Sampling and Analytical Quality Control

Under the LANTDIV Remedial Action Contract (RAC), the procurement of analytical laboratories is governed by the Federal Acquisition Regulations. To assure that the laboratory selected meets acceptable standards, it must demonstrate that it participates in the USEPA Contract Laboratory Program (CLP) or that it holds a current validation by the United States Army Corps of Engineers.

QC procedures were implemented prior to and during sampling activities. The applicable sampling and analysis plan was reviewed by the project engineer and sampling technicians prior to the sampling event. Certified-clean sample jars were used for all samples sent to the off-site testing laboratory. Sampling was performed using disposable sample gloves together with pre-wrapped, dedicated, disposable, Teflon sample scoops or stainless-steel sampling augers, which were decontaminated between acquisition of each sample. Prior to shipment, stored samples were chilled using ice and coolers designated for sample storage.

Where appropriate, trip blanks accompanied shipments of samples to be analyzed for VOCs. Field blanks were generated when decontaminated sampling equipment was used to obtain samples. Chemical compounds detected in either field or laboratory blanks were indicated in both the laboratory analytical reports and analytical summary tables. Samples were always shipped under chain-of-custody to the testing laboratory. The chain-of-custody was signed at each point of transfer. Prior to shipping, the chain-of-custody was typically inspected by the project engineer for completeness and accuracy. At the completion of field activities, the laboratory analytical reports were reviewed by a senior OHM chemist for compliance with laboratory deliverable requirements (Section 5.0).

Collection and analysis of duplicate samples was conducted for QC purposes as specified in the FSAP and CSAP. The purpose of duplicate sampling is to compare the analytical results for a designated sample with that of a duplicate sample collected at the same location, without notifying the testing laboratory as to which sample the duplicate corresponds to in the shipment. The concentrations of a chemical compound detected in the two samples is then compared using relative percent difference, such that 0 percent represents an identical result for both samples.

2.1.5 Construction Quality Control

QC testing during each phase of construction was conducted as set forth in the project specifications, the OHM Construction Quality Assurance Plan (CQAP), and the Independent Geosynthetics Construction Quality Assurance and Operations Plans (Geosynthetics CQA Plan) prepared by I-Corp International, Inc.

(I-Corp). QC inspections were documented by on-site engineers and technicians. Where appropriate, QC test locations were surveyed and the data tabulated to comply with QC record keeping requirements.

Upon completion of the modified landfill cap design, construction specifications were revised and submitted to EFA-Chesapeake for review and approval. QC inspection and testing were updated to reflect modifications in the landfill cap design. Specific QC requirements and tests are indicated in the aforementioned QC documents.

2.2 INVESTIGATIVE DATA

This section describes sampling and analytical activities associated with landfill material delineation, landfill seeps along the western drainage, and characterization of the liquid disposal pits. Analytical results are presented below for each sampling event, and are also summarized in tables provided at the end of this report. The laboratory analytical reports for investigative sampling at Site 2 are provided in Appendix A. The locations of samples collected by OHM at Site 1 are shown on Figure 3.

2.2.1 Landfill Perimeter Delineation

Test pits were advanced by OHM along the perimeter at Site 1 during July and August 1994 to more accurately delineate the southern, western, and northern limits of landfill material. Locations of these test pits are shown on Figure 2. The revised landfill delineation was used to develop an operational approach for the excavation of landfill material found outside the limits of the future landfill cap. Upon excavation, the landfill material was placed within the design limits of the landfill cap.

During the excavation of Test Pit No. 020B, located near the western limit of the landfill cap, gray sediment was encountered at a depth of approximately 1 foot below ground surface (bgs). Similar gray sediment was found in other test pits advanced northwest of the established landfill cap limit.

On 21 July 1994, EFA-Chesapeake authorized collection and analysis of the gray fine-grained sediment encountered in Test Pit No. 020B. Proposed analyses of the grab sample were to include total nitrates and RCRA TCLP metals. The analyses were intended to assess whether the sediment may be flyash or material associated with the former sewage treatment plant located at Site 2.

2.2.1.1 Sampling Methodology

A sample of the gray sediment, designated TP020, was collected from Test Pit No. 020B at a depth of approximately 3 feet bgs. The location of Sample TP020 is shown on Figure 3. The sample material was placed in certified-clean sample jars using a dedicated Teflon sampling scoop. The sample was forwarded under chain-of-custody to ASC, where it was analyzed for nitrate content and RCRA metals by TCLP.

2.2.1.2 Analytical Results

Sediment sample TP020, collected from Test Pit No. 020B, was analyzed for nitrate content and RCRA TCLP metals. Metals and nitrates are typical constituents of flyash or drying bed material. Total nitrate measured 0.064 milligrams per kilogram (mg/kg). Concentrations for metals were well below TCLP regulatory levels. Analytical results do not support the possibility that the gray sediment is flyash or drying bed material. The results are summarized in Table 2-1.

2.2.2 Seep Characterization

Seepage has been observed at several locations in or near the northwestern drainage. Two seeps, designated A and B, have been identified near the perimeter of the Old Landfill. Seep A, located in the bank of the western drainage, is intermittent with continuous flow occurring during periods of greater precipitation. Seep B, located approximately 900 feet northeast of Seep A, maintained a steady discharge from the northwest toe of the landfill into the western drainage prior to landfill cap construction. Seep B currently discharges in the general area of the newly established riparian terrace northwest of the landfill cap.

2.2.2.1 Sampling Methodology

Aqueous samples were collected from Seep A and Seep B on 12 August 1994. At the request of EPA-Chesapeake, a third aqueous sample, designated Seep B2, was collected on 15 June 1995 at the location where Seep B discharges into the riparian terrace northwest of the landfill cap. The samples, which were forwarded to ASC, were analyzed for the following parameters:

- Oil & Grease
- Sulfide (total as Sulfur)
- Chemical Oxygen Demand (COD)
- Ammonia (total as Nitrogen)
- Biochemical Oxygen Demand (BOD)
- Phenols
- Hexavalent Chromium
- Flashpoint
- Halogens (total as Chlorine)
- Total Suspended Solids (TSS)
- Total Volatile Solids (TVS)
- pH
- Total Cyanide
- Target Compound List (TCL) Pesticides and PCBs
- TPH
- TCL Volatile Organic Compounds (VOCs)
- TCL Semivolatile Organic Compounds (SVOCs)
- Target Analyte List (TAL) Metals
- RCRA TCLP Pesticides
- RCRA TCLP Herbicides
- RCRA TCLP Metals.

2.2.2.2 Analytical Results

The laboratory results, which are summarized in Table 2-2, have been used to characterize the liquids discharging from Seeps A and B. The Seep A water sample generally contained significantly lower concentrations of all chemical constituents. Elevated chemical parameters in the water sample from Seep B were as follows: oil & grease [10.8 milligrams per liter (mg/L)], COD (1,530 mg/L), ammonia (86 mg/L), TSS (7,030 mg/L), and TVS (4,410 mg/L). In addition, the Seep B sample contained concentrations of aluminum (333 mg/L), arsenic (0.552 mg/L), barium (6.97 mg/L), beryllium (0.037 mg/L), manganese (0.18 mg/L), and vanadium (0.26 mg/L). Seep B2 contained significantly lower concentrations of the aforementioned parameters: oil & grease (1.15 mg/L), COD (20.8 mg/L), ammonia, (0.212 mg/L), TSS (43 mg/L), TVS (187 mg/L), aluminum (1.72 mg/L), arsenic (<0.002 mg/L), barium (0.067 mg/L), beryllium (<0.007 mg/L), manganese (1.05 mg/L), and vanadium (0.006 mg/L).

Seepage was contained during excavation of the landfill material along the northwest perimeter of the landfill cap and was disposed of at the Valley Forge Sewage Authority, a publicly-owned treatment works (POTW) located in Phoenixville, Pennsylvania.

2.2.3 Northern Finger Pit

2.2.3.1 Sampling Methodology

On 8 October 1994, a composite sediment sample, designated NPIT, was collected from the bottom of the northern finger pit. Composite sample NPIT was generated from sediment obtained between 0 to 12 inches bgs along the bottom of the pit. The NPIT sample was tested by ASC for the full RCRA TCLP and RCRA Characteristics.

2.2.3.2 Analytical Results

The TCLP did not indicate any exceedances of the maximum contaminant standards. RCRA Characteristics obtained for NPIT were within acceptable limits. Analytical results for sample NPIT are summarized in Table 2-3.

2.2.4 Southern Finger Pits

2.2.4.1 Sampling Methodology

On 8 October 1994, a composite sediment sample, designated SPIT, was collected from two of three adjacent finger pits located from 20 to 60 feet within the southern limits of the future landfill cap. It is believed that the southern finger pits were used for disposal of liquid wastes, most probably waste oils and solvents associated with cleaning of petroleum storage tanks.

Composite sample SPIT was generated from sediment obtained between 0 to 12 inches bgs in the two westernmost pits. Collection of the SPIT sample material was biased toward the two westernmost pits based on prior elevated contaminant levels seen in previous sampling data and visual indications of environmental impact.

On 7 November 1994, a second composite sample, designated SPIT2, was collected during the excavation of the southern liquid disposal pits. Composite sample SPIT2 was a composite of stained sidewall soils collected from approximately 5 to 12 feet bgs.

2.2.4.2 Analytical Results

Composite sample SPIT was analyzed by ASC for RCRA Characteristics and the full RCRA TCLP. TCLP analyses did not indicate any exceedances of the maximum contaminant standards. RCRA Characteristics obtained for the sample were within acceptable limits. The analytical results for sample SPIT are presented in Table 2-4.

Composite sample SPIT2 was analyzed for the full RCRA TCLP, TCL VOCs (USEPA Method 8240), and Total Petroleum Hydrocarbons by Infrared Spectrometer (TPH-IR) (USEPA Method 418.1). TPH-IR results for the composite sidewall sample measured 193,000 mg/kg. All detected VOCs were below levels of concern. The TCLP did not exceed maximum contaminant standards for any parameters. The analytical results for sample SPIT2 are presented in Table 2-4. All soils having visual indications of environmental impact in the southern finger pits were excavated, solidified, and transferred to the landfill ravine area during

November and December 1994, where they were covered to prevent any migration prior to installation of the landfill cap. The site of such relocated contaminated materials is recorded in the as-built drawings.

2.2.5 Rubble Landfill Sediment Trap Area

2.2.5.1 Sampling Methodology

A discrete sediment sample, designated 1FG, was collected on 15 March 1995 from the excavation created by the removal of the rubble landfill sediment trap berm. The sediment trap berm was removed because stormwater was infiltrating through the berm and discharging into the work area below the berm. Upon excavation of the berm, it was determined that the berm and the underlying fill was composed of incinerator material and landfill debris saturated with dark liquid. Sample 1FG was collected to characterize the dark-colored, saturated fill material underlying the berm.

2.2.5.2 Analytical Results

Sample 1FG was analyzed for TPH by USEPA Method 8015. The TPH analysis provided a concentration of 1,400 mg/kg of both diesel and heavier petroleum hydrocarbon content. The analytical results are summarized in Table 2-5. The berm fill and the underlying darkly stained material were removed to the depth of a clayey layer. The clay layer limited further vertical migration of PHCs. The excavated soils were placed within the limits of the landfill cap and covered with clean fill on a daily basis.

2.3 POST-EXCAVATION DATA

2.3.1 Northwest Waste Material Excavation

2.3.1.1 Sampling Methodology

Near the end of field work to remove materials north of the future landfill cap, the MDE - Waste Management Administration requested the collection of post-excavation samples following the removal of visible waste materials. MDE requested, and EFA-Chesapeake authorized, preparation of a CSAP for the northwest excavation area. Based on discussions between MDE and EFA-Chesapeake, the CSAP was revised and subsequently finalized on 10 March 1995 prior to collection of the post-excavation samples.

MDE requested that both composite and discrete post-excavation samples be collected and that the samples be analyzed for TCL and TAL parameters. In addition, MDE requested that a sample be collected from coal clinkers located near the northwest removal action at Site 1. For further discussion of coal clinker sampling, refer to Section 2.3.2.

Between 15-20 March 1995, post-excavation confirmation sampling was performed in soils northwest of the landfill where waste materials had been excavated. Collection and analysis of both composite and discrete post-excavation samples were performed concurrently as provided for in the CSAP, dated 10 March 1995. The excavation resulting from landfill material removal was divided into six sub-areas approximately equal in size, designated A through F. Within each sub-area, three discrete sampling locations were established that were well-spaced and biased toward any soil discoloration.

Soils from the three locations within a given sub-area were combined to form a composite sample, for a total of six samples: AC, BC, CC, DC, EC, FC. The soils were collected from between 0 and 12 inches bgs. The six composite samples were analyzed by AEN for all TCL parameters (except VOCs) and for TAL metals. Standard sampling and analysis protocol dictates that composite samples not be analyzed for VOCs.

In addition, a discrete soil sample was collected from 0 to 12 inches bgs at each of the three locations within each sub-area, for a total of 18 discrete samples from all six sub-areas. One of the three discrete samples collected from within each sub-area was immediately analyzed by AEN for all TCL parameters and TAL metals. The six analyzed discrete samples were 3AC, 3BC, 1CC, 1DC, 1EC, and 1FC. The other two discrete samples from each sub-area were stored at the testing laboratory in the event that further analysis was required.

For laboratory QA, a duplicate soil sample was randomly collected from discrete sampling point 1DC. The duplicate sample was forwarded to the testing laboratory with the other discrete and composite samples without any indication to the testing laboratory of its relationship to sample location 1DC.

The northwest excavation was advanced to the extent necessary to remove visible waste materials and stained soils. Portions of the excavation floor and walls were over-excavated, to depths reaching 15 to 20 feet below grade, to maximize removal of potentially impacted soils. Following the collection of the required samples, and with the onset of heavy rains, the excavation was backfilled to assure slope stability along Maryland Route 276. Composite and discrete sample results were provided to EFA-Chesapeake for use in preparing the Human Health Risk Assessment for Site 1.

2.3.1.2 Analytical Results

TAL total metals analysis of the composite samples detected both beryllium (all six samples) and manganese (two samples) at elevated concentrations. Other TAL metals were either not detected or at low concentrations in the composite samples. Concentrations of beryllium ranged from 0.71 mg/kg to 2.1 mg/kg for all samples. Manganese measured 843 mg/kg in sample CC and 448 mg/kg in sample FC.

The analytical results for the composite post-excavation soil samples are summarized in Table 2-6A. The laboratory analytical reports are provided in Appendix B.

VOCs, SVOCs, and pesticides were detected at low levels in the discrete post-excavation soil samples from the northwest excavation. TAL metals analysis detected beryllium (all six samples) and manganese (four samples) at elevated concentrations. Beryllium ranged from 0.91 to 1.6 mg/kg and manganese ranged from 392 to 934 mg/kg in the elevated samples.

The analytical results for the discrete post-excavation soil samples are summarized in Table 2-6B. The laboratory analytical reports are provided in Appendix B.

2.3.2 Coal Clinkers

2.3.2.1 Sampling Methodology

In conjunction with post-excavation sampling for the northwest removal action, MDE requested that sampling and analysis of coal clinkers encountered at Site 1 be included in the CSAP. The coal clinkers were observed generally within 1 to 2 feet of the ground surface near the Route 276 fenceline, northwest of the Old Landfill; the coal clinkers appeared to form an old road bed or parking surface. As specified in the CSAP, a grab sample, designated C1, was collected on 20 March 1995 from the northern sidewall of the northwest landfill material excavation. The sample was forwarded to AEN, the testing laboratory for the Site 1 post-excavation sampling phase, to be analyzed for RCRA TCLP SVOCs and RCRA TCLP metals.

2.3.2.2 Analytical Results

TCLP (SVOCs and metals) results for coal clinker sample C1, were below minimum detection limits. The analytical results for coal clinker sample C1 are summarized in Table 2-6C. The laboratory analytical report is provided in Appendix B.

2.4 QUALITY CONTROL DATA

2.4.1 Laboratory Duplicate Analysis

Duplicate samples from Site 1 consisted of discrete samples collected at the same location. This may contribute to the variance in Relative Percent Differences (RPDs) for the organic portion of the results. The inorganic results exhibited greater reproducibility than the organic results. One reason for this may be that the metal concentrations represent naturally-occurring levels that are better distributed in the native soils. Comparative results and RPD values for Site 1 duplicate samples are provided in Table 2-7.

The equation for calculating RPD is:

$$RPD = \frac{(S_1 - S_2)}{[(S_1 + S_2)/2]} * 100$$

where S_1 and S_2 are Sample 1 and Sample 2 results, respectively.

Due to the small number of samples collected at Site 1, both during investigative and post-excavation sampling efforts, collection of a duplicate sample was proposed only during the critical post-excavation sampling phase following landfill material removal northwest of the landfill cap.

2.4.2 Landfill Cap - Soil Compaction

The landfill cap final cover layer was tested for percent compaction using a nuclear densometer per ASTM D2922 and D3017. The compaction criteria was 90 percent of the maximum ASTM D698 dry density, regardless of moisture content. FWA Geosciences, Inc. (FWA Geosciences) of Bel Air, Maryland, generated the moisture-density curves for the fine mason and utility sands used in the final cover layer. Compaction tests were performed on each lift of the final cover layer at a rate of one passing test per 5,000 square feet. A minimum of one test was performed per 5,000 square feet per lift. The results of the field compaction testing are provided in Appendix G. The geotechnical testing data is provided in Appendix H.

2.4.3 Landfill Cap - Geomembrane Seams

The geomembrane seams were subjected to both non-destructive and destructive QC testing during installation based on test methods and frequencies presented in the Geosynthetics CQA Plan, dated February 1995. Non-destructive testing of geomembrane seams was performed by Solmax Geosynthetics, Inc. (Solmax), the third-party geosynthetics installer.

Non-destructive methods were used to verify the continuity of all high-density polyethylene (HDPE) geomembrane seams. The air pressure test was used for double-track geomembrane fusion welds. Where air pressure testing could not be performed, generally at extrusion seams located at corners, close patches, and at end to-end panel seams on slopes, vacuum box testing was implemented as a second type of non-destructive

testing. The results of the air pressure and vacuum box testing are presented in the Report on Quality Control Procedures prepared by Solmax. The Solmax report is provided in Volume 3 of the Contractor Closeout Report.

Destructive testing of seam samples collected by I-Corp was performed both on site using a calibrated field tensiometer and off site by TRI/Environmental, Inc. (TRI), of Austin, Texas, a geosynthetics testing laboratory. Destructive geomembrane seam samples, collected at a frequency of one per approximately 500 lineal feet of seam, were evaluated by means of peel and shear tests. All destructive test results are included in the I-Corp Geosynthetics Construction Quality Assurance (CQA) Report dated 29 June 1995, which is provided in Volume 3 of the Contractor Closeout Report.

2.5 MATERIAL TESTING DATA

2.5.1 Soil Materials - Geotechnical Properties

Geotechnical laboratory testing was conducted for both on-site and imported materials to identify their physical properties and suitability for specific construction applications. The material testing laboratory for the project was FWA Geosciences.

FWA Geosciences tested on-site soils obtained from borrow pit areas established by OHM, on-site soil removed from the Wetland Mitigation Area, and both the fine mason and utility sands obtained from York Building Products, Inc. of Perryville, Maryland.

Geotechnical tests performed by FWA Geosciences included direct shear (ASTM D3080), Atterberg Limits (ASTM D4318), grain size (ASTM D422), and soil classification (ASTM D2487). Direct shear testing was typically performed for materials intended for use in the final cover and barrier layers on landfill slopes. The direct shear test was performed at 90 percent of the maximum dry density (ASTM D698) and within 2 to 3 percent of the optimum moisture content for confining pressures of 400, 1,000, and 2,000 pounds per square foot. In addition, moisture-density curves were generated for materials used for controlled fill (ASTM D698). The maximum standard ASTM D698 dry density, regardless of optimum moisture, was used to perform QC testing in the field during soil compaction.

The geotechnical test reports prepared by FWA Geosciences are provided in Appendix H.

2.5.2 Soil Materials - Chemical Properties

Imported earthen construction materials were sampled and analyzed prior to delivery on site to verify that specific hazardous constituents were not present in the materials. Each material was tested for PCBs and all RCRA TCLP parameters, VOCs, SVOCs, pesticides, herbicides, and metals. The following imported materials were sampled and tested:

- Leaf compost, commercially referred to as "Leafgro," used in producing topsoil
- Sand fill from York Building Products, Inc.
- Bank run fill from Cecil Sand & Gravel, Inc. of Perryville, Maryland
- Low permeability soil (clay) from Stancills, Inc. of Perryville, Maryland, used for lining wetland cells

- Topsoil from Crouse Construction, Inc. (Crouse)
- Select fill from Crouse for Site 1 access road extension.

Analytical results for the indicated samples are summarized in Table 2-8. The laboratory analytical data reports are provided in Appendix C.

2.5.3 Soil Materials - Agronomic Properties

Mixtures comprising different fractions of on-site borrow and compost were prepared and forwarded to Myers Analytical Laboratories, Inc. (Myers) for agronomic property testing. The mixtures were analyzed for pH; buffer pH; cations in pounds per acre; cation exchange capacity; percent base saturation of potassium, calcium, and magnesium; and percent organic matter. Myers soil test reports are provided in Appendix H.

Test results and recommendations provided by Myers were used in combination with information provided by seed vendors and hydroseed contractors to establish a revised turf specification for both the landfill cap and adjacent areas. The topsoil mixture used on the landfill cap is best represented by the Myers soil test report dated 31 March 1995 for a sample identified as "Topsoil 4 to 1." This sample mixture contained an organic content of 3.65 percent.

2.5.4 Landfill Cap - Geosynthetic Properties

QC testing was performed by the manufacturers to verify that materials met product specifications. Geomembrane QC testing consisted of specific weight, melt flow index, and carbon black content. Manufacturer QC certificates are provided in the Geosynthetics CQA Report for all geosynthetic materials used in landfill cap construction.

Prior to geosynthetics construction, I-Corp instituted a conformance testing program for geosynthetics materials used in landfill cap construction. Laboratory conformance testing was performed by TRI. Rolls of single- and double-sided geocomposite, staged on site, were sampled at a rate of one sample per 100,000 square feet of material. Since both smooth and textured HDPE geomembranes were used in cap construction, one sample per 100,000 square feet of each material was collected for conformance testing. The results of all conformance testing are in the I-Corp Geosynthetics CQA Report provided in Volume 3 of the Contractor Closeout Report.

2.5.5 Material Disposal Characterization

On 23 January 1995, a composite sample, designated PPE1, comprised of spent personal protective equipment (PPE), was collected from three 20-cubic-yard containers staged at the Site 1 drill field. The sample was analyzed for RCRA characteristics, TPH, PCBs, and the full RCRA TCLP. The results of the analyses were used to obtain disposal facility acceptance for the materials. Only PHICs were detected in the PPE at a concentration of 19,000 mg/kg. The PPE was classified as non-hazardous waste and was disposed of at Modern Landfill, a non-hazardous landfill located in York, Pennsylvania. Analytical results for the PPE sample are summarized in Table 2-9.

On 16 March 1995, a composite sample was collected from each of two vegetative debris piles at the Site 1 drill field. Composite sample 1WPC was collected from a staged pile of coarsely-ground tree stumps. Composite sample 2WPC was collected from a second staged pile of unground trees and stumps. The two samples were analyzed by AEN for RCRA Characteristics, Total Petroleum Hydrocarbons by Gas Chromatograph (TPH-GC), PCBs, and the full RCRA TCLP. The results are summarized in Table 2-10.

The TPH-GC result of 940 mg/kg for sample 2WPC was suspect because the sampled material consisted primarily of bark from unground trees and stumps. A subsequent examination of the sampling approach suggested that one of the sampling points for the 2WPC composite sample may have been coincident with a localized spill of diesel fuel or lubricating oil from logging equipment. A second, more representative composite sample (designated 051795-1) was collected on 18 May 1995 from the unground vegetative debris stockpile and forwarded to AEN for TPH-GC analysis. A TPH concentration of 0.38 mg/kg was detected in sample 051795-1.

On 31 July 1995, a composite sample, designated DRUM1, was collected from thirty-eight 55-gallon drums staged on the Site 1 drill field. The drums contained PPE, plastic sheeting, fuel oil sludge, and soil associated with removal and cleaning of USTs at Site 1. In addition, the drums contained drill cuttings generated by others during well installation activities. DRUM1 was analyzed for TPH-IR; benzene, toluene, ethylbenzene, and xylene (BTEX); and total organic halogen (USEPA Method 9020). TPH for the sample measured 74,000 mg/kg. Toluene, ethylene, and xylenes were detected at low concentrations. The data was used to establish a waste disposal profile. The drums were removed and subsequently consolidated by Clean Harbors of Baltimore, Inc. Prior to disposal as non-hazardous waste at Modern Landfill in York, Pennsylvania.

3.0 SITE 2 SAMPLING AND ANALYSIS

3.1 SAMPLING PLAN AND QUALITY CONTROL

Field sampling, laboratory testing, and associated QC for Site 2 were based on the following submittals:

- Construction specifications prepared by E&E, dated March 1994 and revised by E&E in June 1994
- OHM FSAP, dated 18 May 1994
- OHM Revised Proposal for Remedial Action, dated 23 May 1994
- OHM CSAP, dated 9 December 1994.

The FSAP and CSAP are provided as appendices to Volume 1. With the approval of EFA-Chesapeake and in close communication with Mr. Ed Carlson of the MDE, the approach to sampling and analysis at Site 2 was modified as a result of unanticipated site conditions encountered during investigative sampling and contaminated soil removal. The modifications to the original sampling and analysis specifications and plans are provided in the following section.

3.1.1 Sampling Plan Modifications

MDE - Waste Management Administration concerns with regard to potential halogenated volatile organic compound (HVOC), pesticide, and metals contamination at Site 2 were documented by OHM in correspondence to EFA-Chesapeake, dated 1 July 1994. After further communications with EFA-Chesapeake and MDE, OHM was directed to perform additional analyses consisting of HVOCs (USEPA Method 8010), TCL pesticides (USEPA Method 8080), and RCRA TCLP metals for soil samples collected in the vicinity of monitoring wells 2-GW-6 and 2-GW-8 and in the separator pit area. This modification applied to the separator pit inflow and outflow swales as well. In addition, OHM was authorized by EFA-Chesapeake to collect soil and sediment samples in the forested wetland north of the separator pit to more accurately delineate the vertical and horizontal extent of pesticide contamination detected by E&E during its Remedial Investigation.

On 8 August 1994, OHM requested, and subsequently received, authorization from EFA-Chesapeake to modify the sampling approach in the separator pit due to limited access and unanticipated subsurface conditions. The modified approach consisted of the collection of eight sediment samples, two from each quadrant of the separator pit. Due to difficulty in advancing the portable sampling equipment, a tracked excavator would be used to collect the required number of samples. The modification called for all eight samples to be analyzed for HVOCs, TCL pesticides, and RCRA TCLP metals, in addition to TPH-GC and BTEX.

In September 1994, EFA-Chesapeake authorized collection of a sample from dark asphalt-like material observed in Shell Building C, located in the Firefighter Training Area. The sample was analyzed for TCL VOCs, TCL SVOCs, pesticides and PCBs, TAL metals, and cyanide. In addition, EFA-Chesapeake authorized collection of a composite sample from standing water located in all three shell buildings. The liquid sample was analyzed for the same parameters as the asphalt-like material.



During removal of contaminated soils from the separator pit and at former UST locations, EFA-Chesapeake and MDE - Waste Management Administration requested that OHM collect samples of standing water in the northwestern and southwestern portions of the separator pit, and from the excavation at the former location of UST Nos. 3 and 4. EFA-Chesapeake directed that the separator pit liquid samples, collected on 27 October 1994, be analyzed for TPH-IR, TCL Pesticides, TCL VOCs, and TCL SVOCs. The water sample collected at the former location of UST Nos. 3 and 4 on 27 October 1994 was analyzed for TPH-IR.

Upon receipt of MDE authorization to use water treated at Site 2 for on-site dust control, OHM updated the analytical parameters for water treatment system influent and effluent. Batches of influent and effluent continued to be analyzed for TPH and BTEX. Modifications consisted of the addition of periodic TCL pesticide analysis and the deletion of TSS due to the use of treated water as dust control.

In June 1995, EFA-Chesapeake directed that samples be collected from two groundwater seeps at Site 1, designated A and B, and one seep at Site 2, located within the limits of the former firefighter training pad. A water sample designated Seep B2 was collected from Seep B at Site 1 on 15 June 1995. The sample was analyzed for the same chemical parameters as were performed for water samples collected from Seeps A and B on 12 August 1994. Seep A at Site 1 and the seep at Site 2 had ceased flowing as of June 1995 and, therefore, could not be sampled.

3.1.2 Confirmation Sampling and Analysis Plan

At the request of the MDE and EFA-Chesapeake, OHM prepared a CSAP for Site 2, dated 9 December 1994. The CSAP addressed post-excavation confirmation sampling and analysis to be performed following removal of contaminated soils. The CSAP also summarized Site 2 analytical results through November 1994. The CSAP for Site 2 applied to the following general areas:

- Former UST and AST locations
- Concrete separator vaults
- Separator pit including floor and containment berm
- Forested wetland north of the separator pit.

At former UST and AST locations, samples were to be collected from each sidewall and the bottom of the excavation. Due to the size of some excavations, the number of sidewall samples was increased. Excavation bottom samples were typically not collected when groundwater was present throughout the bottom of the excavation. Only a bottom sample was collected for AST No. 7, since the excavation measured less than 3 feet bgs. Samples from each excavation were analyzed, at a minimum, for TPH. When a leaking tank was suspected based on tank removal documentation, one sample was analyzed for BTEX and halogenated VOCs. Sampling and analysis at former UST and AST locations were conducted in conformance with the CSAP with the aforementioned field modifications to accommodate site conditions.

In the separator pit area, post-excavation samples were collected from the floor of the separator pit using a 40-foot by 40-foot grid spacing, and from berm excavation sidewalls using a 50-foot sample spacing. The samples were analyzed for TPH. In addition, four samples were collected from the separator pit floor and two from the west and south berm areas for halogenated VOCs, BTEX, and pesticide analyses. Sampling and analysis in the separator pit area were conducted in conformance with the CSAP.

In the forested pesticide-impacted wetland north of the separator pit, samples were collected at 50-foot intervals along narrow ditches and swales. In addition, samples were collected from larger areas at a rate of

one sample per no more than 2,500 square feet. Sampling and analysis in the pesticide-impacted wetland were conducted in conformance with the CSAP.

3.1.3 Sampling and Analysis of Imported Materials

As stated in the FSAP and the project specifications, imported materials were to be sampled and analyzed prior to importation and use on site for construction, i.e., fill placement. The purpose of the sampling was to verify that materials designated of use on site were not contaminated prior to importation.

3.1.4 Sampling and Analytical Quality Control

A discussion of sampling and analytical QC issues and procedures is provided in Section 2.1.4.

3.1.5 Construction Quality Control

Construction QC was performed throughout the Site 2 removal action and subsequent restoration to document that tasks were completed in accordance with the design, specifications, and plan documents. QC responsibilities included inspection of erosion control and drainage features, sample acquisition, handling, and documentation, removal of contaminated materials, importation of construction materials, fill placement, survey activities, water treatment, including sampling of influent and effluent, and site restoration, including seeding and wetland planting.

3.2 INVESTIGATIVE DATA

This section describes investigative sampling and analytical activities conducted at Site 2 by OHM. Investigative sampling was performed at Site 2 to assess the type and extent of environmental impact at areas of concern. The locations of investigative samples collected by OHM at Site 2 are shown on Figure 4.

3.2.1 Soils Below Concrete Firefighter Training Pad

3.2.1.1 Sampling Methodology

Prior to the soil removal action at the Firefighter Training Area, soil samples were collected from below the concrete firefighter training pad (Area F) for field screening and laboratory analysis. Samples were collected at 2-foot intervals to a depth of 4 feet using a stainless-steel hand auger and, in some instances, a rubber-tire backhoe. Sampling locations were established based on a 44-foot-square grid. Soil samples were collected from each interval, 0 to 2 feet bgs and 2 to 4 feet bgs, and screened using field instrumentation. The initial field screening step consisted of a headspace screen using a photoionization detector (PID). Samples with headspace results exceeding 10 mg/kg were further evaluated using a Foxboro Miran IACVF field TPH infrared analyzer. Samples exceeding 100 mg/kg using the TPH analyzer were forwarded to the testing laboratory for verification analysis. Field screening and laboratory TPH results are summarized in Table 3-1.

3.2.1.2 Analytical Results

Seven soil samples, with a TPH exceeding 100 ppm using the field TPH analyzer, were tested in a laboratory for TPH-IR [USEPA Method 418.1 modified for soils (418.1M)]; TPH-GC; and BTEX (USEPA Method 8020). Of the seven samples, four were collected from the 0 to 2 feet bgs interval and three were collected from the 2 to 4 feet bgs interval.



TPH-GC concentrations for samples collected from 0 to 2 feet bgs were all less than the laboratory minimum detection limit (MDL) of 2.89 mg/kg for light PHC, <3.32 to 828 mg/kg for medium PHC, and <16.5 to 786 mg/kg for heavy PHC. TPH-IR concentrations for this interval ranged from <9.87 to 1,380 mg/kg. Other detected compounds between 0 to 2 feet bgs were below applicable levels of concern.

TPH-GC concentrations for samples collected from 2 to 4 feet bgs ranged from less than the MDL of 2.27 mg/kg to 11.9 mg/kg for light PHC, <3.26 to 53.5 mg/kg for medium PHC, and <16.4 to 105 mg/kg for heavy PHC. TPH-IR concentrations for this interval ranged from <9.77 to 257 mg/kg. Other detected compounds between 0 to 2 feet bgs were below applicable levels of concern.

Based on the laboratory analytical results, concrete and underlying soil to a depth of approximately 2 feet were removed in the vicinity of sample locations F17A and F22A. Additional soil samples, collected from the floor of the resulting excavations, were analyzed for TPH-IR (Method 418.1M). The TPH concentration for sample F-17-2 (704 mg/kg), collected from 2 to 3 feet below original grade, exceeded the MDE TPH standard of 100 mg/kg.

Analytical results for investigative sampling below the firefighter training pad are summarized in Tables 3-1 and 3-2.

3.2.2 Adjacent To Monitoring Wells

3.2.2.1 Sampling Methodology

Soil samples were collected in the vicinity of monitoring wells 2-GW-6 and 2-GW-8, both located in the former Firefighter Training Area at Site 2. The objective of sample collection around 2-GW-6 (Area A) and 2-GW-8 (Area B) was to characterize the degree and extent of environmental impact prior to excavation of the soil surrounding the two wells. Based on former Navy activities conducted at the firefighter training pad, PHCs were considered the primary compounds of concern. VOCs, polynuclear aromatic compounds (PAHs), and SVOCs associated with petroleum products have been detected in groundwater samples collected from 2-GW-8 during prior investigative activities.

Areas A and B are defined by two circular areas each with a diameter of 75 feet. Monitoring well 2-GW-6, located within the limits of the firefighter training pad, represents the center of Area A. Monitoring well 2-GW-8, located approximately 30 feet south of the firefighter training pad near the concrete oil-water separator vaults, represents the center of Area B. Both monitoring wells were abandoned in conformance with MDE and Cecil County Health Department requirements as part of OHM's remedial activities in the Firefighter Training Area. Portions of the concrete firefighter training pad surrounding the two monitoring wells were subsequently removed during the investigation and remediation of the Firefighter Training Area.

Sample collection was performed in Areas A and B on 2 August 1994 using stainless steel hand augers. Ten soil samples were collected from five sample locations at each area. Two soil samples were collected at each sampling location: an upper sample from 0 to 2 feet bgs and a lower sample from 2 to 4 feet bgs, for a combined total of 20 soil samples from both areas.

3.2.2.2 Analytical Results

All samples were analyzed by ASC for TPH-GC and BTEX (USEPA Method 8020). In addition, samples from both depth intervals at two locations within each area (eight samples total) were analyzed for TCL pesticides (USEPA Method 8080), TCL halogenated volatile organic compounds (HVOCs; USEPA Method 8010), and RCRA TCLP metals.

One soil sample, B05A, measured 886 mg/kg when analyzed for TPH-GC. This result for sample B05A exceeded the MDE TPH standard of 100 mg/kg. Sample B05A was collected between 0 to 2 feet bgs. The area, where Sample B05A was collected, was later excavated during removal of impacted soils associated with the concrete separator vaults. Analytical results for other samples did not exceed applicable levels of concern.

The analytical results for Areas A and B are summarized in Tables 3-3 and 3-4, respectively.

3.2.3 Former Underground Storage Tank Locations

Further excavation near sample location F17A, located within the limits of the concrete firefighter training pad, uncovered former UST piping and a concrete UST "cradle." Other former UST locations were subsequently established using a Firefighter Training Area UST location figure provided by EFA-Chesapeake. Former UST locations were excavated and impacted soils were removed and transported to Site 1 for placement under the landfill cap. Confirmation soil samples were then collected from the sidewalls and bottoms of the resulting excavations prior to placing clean backfill.

3.2.3.1 Sampling Methodology

During excavation of former UST locations, soil samples were collected for field screen testing using the Miran IACVF TPH analyzer. The results of the field TPH analyzer and visual indications of environmental impact were used to determine the extent of impacted soil removal. TPH field analyzer results are not reported here as they were only used to guide impacted soil excavation work.

3.2.3.2 Analytical Results

These field screen investigative samples were not sent to an off-site laboratory for any further testing. However, confirmation samples were collected following impacted soil removal and analyzed at a testing laboratory. The results of the UST confirmation sampling and analysis are discussed in Section 3.3.2.

3.2.4 Firefighter Training Buildings

3.2.4.1 Sampling Methodology

Prior to demolition of the three former firefighter training buildings, located on the concrete pad at Site 2, a composite sample of a tar-like substance (designated BLDG-C-TAR) was collected from the floor of Firefighter Training Building C.

In addition, a composite aqueous sample (designated BLDG H2O) was collected from the water accumulated in the three buildings.

3.2.4.2 Analytical Results

The BLDG-C-TAR sample was analyzed by ASC for all TCL and TAL parameters. All detected compounds were below levels of concern. The analytical results for BLDG-C-TAR are summarized in Table 3-5.

The BLDGH2O aqueous sample was analyzed for all TCL and TAL parameters. Metals were detected below levels of concern. No organic compounds were detected above minimum detection limits. The analytical results for BLDGH2O are summarized in Table 3-6.

Based on the results of the analytical testing, the MDE authorized the demolition of the three firefighter training buildings, and the placement of the resulting debris under the Site 1 landfill cap. The standing water was subsequently pumped to the temporary water treatment system located at Site 2.

3.2.5 Separator Pit - Inflow Swale

3.2.5.1 Sampling Methodology

The stormwater inflow swale to the separator pit, designated Area C, was comprised of a narrow unlined drainage channel that discharged stormwater runoff from the firefighter training pad into the oil separator pit. The drainage swale contained running water only during precipitation events. Three equally spaced sample points were established along the bottom of the inflow swale. Soil samples were collected at each location at intervals of 0 to 2 feet bgs and 2 feet to refusal, generally between 3 and 4 feet bgs.

3.2.5.2 Analytical Results

All samples from the inflow swale were analyzed by ASC for TPH-GC (USEPA Method 8015/8100) and BTEX (USEPA Method 8020). In addition, both sample intervals at one location were also analyzed for TCL pesticides (USEPA Method 8080), TCL HVOCs (USEPA Method 8010), and RCRA TCLP metals.

TPH-GC concentrations of 677 mg/kg and 407 mg/kg for samples C03A and C03B, respectively, both exceeded the MDE TPH standard of 100 mg/kg. Analytical results for other Area C samples did not exceed applicable levels of concern. Soils underlying the entire Area C stormwater swale were removed and placed in the Site 1 landfill.

Analytical results for the Area C inflow swale are summarized in Table 3-7.

3.2.6 Separator Pit - Floor

3.2.6.1 Sampling Methodology

The oil separator pit (Area D) was comprised of a generally square area measuring approximately 170 feet by 170 feet (0.7 acres). The separator pit floor was surrounded on all sides by earthen containment berms. The separator pit was bisected by an earthen fill access road which was previously constructed during the prior remedial investigation. The pit contained from 1 to 3 feet of standing water depending on the location within the pit and seasonal weather conditions.

Shallow test pits were advanced at four well-spaced locations to characterize pit floor sediments. Samples, designated D5, D7, D14, and D20, were collected at 2-foot intervals from 0 to 4 feet bgs. Substantial petroleum product was visible during excavation of the shallow test pits.

On 11 October 1994, two discrete soil samples, CALIB1 and CALIB2, were collected from separate locations at Site 2. The samples were split, with one set of split samples analyzed on site using the field TPH analyzer and the second set of split samples analyzed at the off-site testing laboratory.

3.2.6.2 Analytical Results

All samples were analyzed by ASC for TCL HVOCs (USEPA Method 8010), TPH-GC (USEPA Method 8015/8100), BTEX (USEPA Method 8020), TCL pesticides (USEPA Method 8080), and full RCRA TCLP.

TPH-GC concentrations for the four samples collected from 0 to 2 feet bgs ranged from 14.2 to 98.7 mg/kg for lighter molecular weight PHC, 9,330 to 162,000 mg/kg for medium PHC, and 2,540 to 39,800 mg/kg for heavier PHC. Other detected compounds between 0 and 2 feet bgs were below applicable levels of concern.

TPH-GC concentrations for samples collected from 2 to 4 feet bgs were below detection limits for light PHC, and ranged from 101 to 1,190 mg/kg for medium PHC, and <424 to 1080 mg/kg for heavy PHC. Other detected compounds between 2 and 4 feet bgs were below applicable levels of concern.

Investigative analytical results for the separator pit floor, collected prior to the soil removal action, are summarized in Table 3-8. Impacted soils from the separator pit floor were subsequently excavated and transported to Site 1 for placement in the landfill ravine area.

In preparation for TPH soil delineation in the separator pit, two soil samples CALIB1 and CALIB2, were collected on 11 October 1994 and analyzed for TPH-IR by ASC. The results were compared with field TPH analyzer data for the same samples. The field analyzer results were sufficiently close to the laboratory TPH results to support use of the field TPH analyzer for delineation. The laboratory results are summarized in Table 3-9.

3.2.7 Separator Pit - Berms

3.2.7.1 Sampling Methodology

Four investigative soil samples, designated A, B, C, and D, were collected on 25 October 1994 from the excavation sidewalls in the southwest corner of the separator pit. Sampling of the sidewalls was conducted to evaluate the levels of PHC contamination in the excavation. Collection of the four grab samples was biased towards surface soils exhibiting greater petroleum hydrocarbon impact based on visual inspection and product odor. All four samples were analyzed for TPH by USEPA Method 418.1M. In addition, the sample containing the highest TPH concentration was analyzed for SVOCs by USEPA Method 8270.

During excavation of soils from the containment berms surrounding the oil separator pit area, soil samples were collected and screened in the field using a TPH analyzer. Screening results that indicated TPH at a level greater than or equal to 100 mg/kg were used to determine areas requiring additional soil removal. Soil samples having a TPH concentration significantly less than 100 mg/kg (based on a margin of safety) were tested at ASC and AEN to confirm that TPH levels were significantly below 100 mg/kg. The locations of confirmation samples collected from the separator pit berm area are shown on Figure 5. Refer to Section 3.3.5 for further discussion pertaining to confirmation sampling of the separator pit containment berms.

3.2.7.2 Analytical Results

TPH concentrations measured 4,480 mg/kg in Sample A, 73.2 mg/kg in Sample B, 1,690 mg/kg in Sample C, and 9,890 mg/kg in Sample D. Samples A, C, and D exceeded the MDE TPH clean-up standard of 100 mg/kg. Sample D, which contained the highest TPH concentration (9,890 mg/kg), was analyzed for SVOCs. Although SVOCs were not detected in Sample D, the minimum detection limit was 37.2 mg/kg due to TPH matrix interference. Based on the TPH results, additional soils were removed from the southwest portion of the separator pit, and placed in the Site 1 landfill.

Analytical results for all four samples are summarized in Table 3-10.



3.2.8 Separator Pit - Outflow Swale

3.2.8.1 Sampling Methodology

A narrow unlined outflow swale (Area E) conveyed outflow from the oil separator pit to the Happy Valley Branch. Prior to grouting the separator pit outflow culvert, the outflow swale continued to flow at a rate of several gallons per minute.

To assess contamination levels in outflow swale soils, six sample points (designated E1 through E6) were established at equal intervals along the bottom of the swale except where the swale entered a short roadway culvert. Samples were collected in two phases: first from between 0 and 2 feet bgs, and, later, from 2 to 4 feet. Due to refusal of the sampling equipment in the swale at a depth of 2 feet, it was necessary to relocate deeper sampling intervals away from the swale. The composition of the obstruction could not be determined due to turbid water and mud in the bottom of the sample hole.

3.2.8.2 Analytical Results

All samples were analyzed by ASC for TPH-GC and BTEX (USEPA Method 8020). In addition, two samples from 0 to 2 feet bgs and one sample from 2 to 4 feet bgs were also analyzed for HVOCs (USEPA Method 8010), TCL pesticides (USEPA Method 8080), and RCRA metals by the TCLP. A second sample from 2 to 4 feet bgs was analyzed for TCL pesticides only.

TPH-GC concentrations for samples collected from 0 to 2 feet bgs contained less than the MDL of 4.35 mg/kg for light PHC, 48.4 to 7,340 mg/kg for medium PHC, and 77.8 to 6,650 mg/kg for heavy PHC. The pesticide analysis indicated DDD at a concentration of 12.4 mg/kg in Sample E3A (0 to 2 ft bgs). The USEPA risk-based standard (residential soil) for DDD is 2.7 mg/kg. Other detected compounds between 0 and 2 feet bgs were below applicable levels of concern.

TPH-GC concentrations for samples collected from 2 to 4 feet bgs were less than the MDL of 2.95 mg/kg for light PHC, <4.10 to 787 mg/kg for medium PHC, and <19.5 to 104 mg/kg for heavy PHC. Other detected compounds between 2 and 4 feet bgs were below applicable levels of concern.

The analytical results for the Area E outflow swale are summarized in Table 3-11.

Soils within and adjacent to the separator pit outflow swale were subsequently excavated and transported to Site 1 for placement under the future landfill cap. Following the soil removal action, the outflow swale was reconstructed to provide for drainage from the wetlands constructed to ecologically restore the separator pit area.

3.2.9 Separator Pit - Concrete Vault Area

3.2.9.1 Sampling Methodology

Upon receiving authorization from EPA-Chesapeake, OHM proceeded with the demolition and removal of the two concrete oil/water separator vaults located approximately 30 feet south of former Firefighter Training Building C. Soils impacted by fuel oil were encountered in the fill and native soils surrounding the concrete vaults. The fuel oil impacted soils extended to bedrock, and southward to a bedrock ledge located at the northern terminus of former drying beds associated with the former sewage treatment facility.

All sampling for the concrete vault area excavation was performed for the purpose of clean-up confirmation. Investigative samples were not obtained in the concrete vault area prior to excavation because contamination was clearly apparent.

3.2.9.2 Analytical Results

Confirmation sampling methodology and analytical results for the concrete vault area are provided in Section 3.3.7.

3.2.10 Separator Pit - Water

3.2.10.1 Sampling Methodology

In addition to soil samples, OHM collected a single liquid sample from the oil separator pit on 18 August 1994. The liquid sample analytical data was used to establish a potential "worst case" influent stream for the design of the on-site water treatment system. The liquid sample was collected near the location of the soil sample containing the most elevated TPH concentration. The most elevated TPH concentration was located near the outlet structure in the southeast corner of the separator pit. The liquid sample was collected after first agitating impacted pit bottom sediment.

3.2.10.2 Analytical Results

The aqueous sample, designated OWS-1, was analyzed by ASC for TSS, TDS, pH, TPH-GC, TCL VOCs, TCL SVOCs, TCL pesticides and PCBs, and TAL metals. Medium and heavy PHCs were detected at concentrations of 111 mg/L and 22.1 mg/L, respectively. Laboratory analyses found low but detectable levels of Aroclor 1248, toluene, xylene, and 2-methylnaphthalene. The data for the liquid sample is summarized in Table 3-12.

3.2.11 Pesticide-Impacted Wetlands

3.2.11.1 Sampling Methodology

Soil sampling was performed in the wooded wetlands (Area H) northeast of the firefighter training pad and north of the oil separator pit to delineate the extent of pesticides detected during prior investigative activities by others (Remedial Investigation). Sample locations were typically established in areas likely to accumulate elevated concentrations of previously identified pesticide compounds, primarily swales and depressions within the wetland area. Three rounds of sampling were performed: 20 July 1994, 2 and 3 August 1994, and 20 September 1994.

Sampling conducted on 20 July 1994 concentrated on sample collection between 0 to 1 foot bgs. The samples were then shipped to ASC for TCL pesticide analysis (USEPA Method 8080). Analytical results for detected compounds were compared with residential pesticide standards specified in USEPA Risk-Based Concentration Tables, dated 07 January 1994. The results indicated that DDD, DDE, and DDT exceeded the USEPA residential standards for soil. Sample results that exceeded the USEPA pesticide standards were used to establish both deeper sampling intervals and additional sample locations. The additional sampling was performed to vertically and horizontally delineate the extent of pesticide-impacted soils.

During the 2 and 3 August 1994 sampling event, additional soil samples were collected from 1 to 2 feet bgs at locations sampled on 20 July 1994 where pesticide concentrations exceeded USEPA residential



pesticide standards. Additional soil samples were collected from 0 to 1 foot bgs at new sampling locations to allow for horizontal delineation of pesticide impacted soils.

During the 20 September 1994 sampling event, six additional samples were collected from 0 to 1 foot bgs at new sampling locations to further delineate the extent of pesticide impacted soils.

3.2.11.2 Analytical Results

Three pesticide compounds, DDD, DDE, and DDT, were detected above USEPA residential soil standards during the sample events. The USEPA health risk-based standards are 2.7 mg/kg for DDD, 1.9 mg/kg for DDE, and 1.9 mg/kg for DDT. During the three sampling events, eighteen samples collected between 0 and 1 foot bgs, and two samples collected between 1 and 2 feet bgs exceeded the USEPA risk-based standards for residential soils.

The analytical results for the Area H pesticide impacted wetland are summarized in Table 3-13.

3.3 CONFIRMATION DATA

Confirmation samples, both solid and aqueous, were collected at specific locations following removal of contaminated materials. The impacted locations were first determined by means of investigative sampling and analysis. The objective of the confirmation sampling was to verify that the impacted materials, primarily soils and groundwater, had been removed, and the locations had been successfully remediated to the chemical cleanup goals (see Section 1.3).

The confirmation sampling methodologies and corresponding analytical results for each area of concern at Site 2 are presented in the following sections.

3.3.1 Soils Below Firefighter Training Pad

Based on the TPH results of investigative soil samples collected from between 0 and 4 feet bgs below the firefighter training pad (Table 3-1), the concrete pad and underlying soils at sample locations F17 and F22 were removed to a depth of approximately 2 feet bgs over an area measuring approximately 30 feet by 30 feet at each location.

3.3.1.1 Sampling Methodology

Soil grab samples were collected at a depth of approximately 2 feet to verify removal of PHC-impacted soils. Three samples were collected from the excavation centered at former sampling location F17, and four samples were collected from a second excavation centered at former sampling location F22.

3.3.1.2 Analytical Results

The seven soil samples were shipped to ASC to be analyzed for TPH-IR. The four samples located near F22 were determined to be below the MDE standard of 100 mg/kg for TPH. One of the three samples collected near F17, Sample F-17-2, measured 704 mg/kg for TPH. Analytical results for samples collected near F17 and F22 are summarized in Table 3-14.

Due to the elevated TPH result at F-17-2 and the PHC-impacted soils observed adjacent to the F-17-2 sampling location, additional PHC-impacted soil was removed from the F-17-2 location. A cradle for

anchoring an UST and associated piping were discovered during soil removal. Information pertaining to the expanded excavation is provided in Section 3.3.2 (UST Nos. 5 and 6).

3.3.2 Former Underground Storage Tank Locations

3.3.2.1 Sampling Methodology

As part of the Site 2 remedial action, former locations of USTs under or adjacent to the firefighter training pad were excavated to assess subsurface conditions and to remove any remaining PHC impacted soils. Former aboveground storage tank (AST) No. 7 was located in a concrete vault approximately 30 feet south of the Firefighter Training Building A.

During excavation of each former UST location, soil samples were collected and field screened using a TPH analyzer. Field screening results that indicated TPH at a level equal to 100 mg/kg were used to guide soil removal activities. Soil samples having a TPH concentration measurably less than 100 mg/kg were analyzed at ASC to confirm that TPH levels were sufficiently below 100 mg/kg to stop contaminant removal actions.

Confirmation sample locations are shown on Figure 5. Analytical results for confirmation samples at former UST and AST locations are summarized in Tables 3-15 through 3-21.

3.3.2.2 Analytical Results

Analytical methods and results for confirmation samples collected at former UST locations are described below.

UST Nos. 1 and 2

Due to the presence of groundwater at a depth of approximately 11 feet, confirmation soil samples were collected at 11 sidewall locations between 0 and 4 feet above the water table. Sampling was biased toward utility piping observed "daylighting" in the excavation sidewalls. The 11 samples were shipped to ASC where all samples were analyzed for TPH-IR, and three selected samples were analyzed for BTEX (USEPA Method 8020). All samples were below the MDE TPH standard of 100 mg/kg. The analytical data for UST Nos. 1 and 2 is summarized in Table 3-15.

UST Nos. 3 and 4

Samples of both soil and recharged groundwater were collected for off-site laboratory testing during excavation at the former locations of UST Nos. 3 and 4. A sample of stained sidewall soil, designated UST3, was collected on 7 October 1994, and analyzed for TPH-IR and TCL SVOCs (USEPA Method 8270). The TPH-IR concentration of 1,570 mg/kg exceeded the MDE TPH action level of 100 mg/kg. Based on this result, additional soil was removed from the excavation. The analytical results for this sample are provided in Table 3-16A.

Following removal of additional contaminated soil, confirmation samples were collected from all four excavation sidewalls and the excavation bottom. The confirmation samples were analyzed by ASC for TPH-IR and BTEX. One sample, T3BOT, was analyzed for TCL VOCs (USEPA Method 8240). All TPH-IR results were below the MDE TPH cleanup standard. BTEX compounds were not detected in the five confirmation samples and TCL VOCs were detected at low levels. The analytical results for the five confirmation soil samples are summarized in Table 3-16B.

Sampling of the excavation bottom was made possible due to the slow rate at which groundwater entered the excavation. A second sample was collected from the excavation bottom in conjunction with pumping of the excavation to recharge groundwater for liquid sampling.

One groundwater sample designated T3H2O, was collected from the excavation on 27 October 1994 for laboratory TPH-IR analysis by AEN. PHCs were detected at a concentration of 0.154 mg/L in the groundwater sample. The result is provided in Table 3-16C.

UST Nos. 5 and 6

Soil samples were collected for field TPH analysis and off-site laboratory testing by AEN during excavation at the former locations of Tank Nos. 5 and 6. Confirmation soil samples were collected from all four excavation sidewalls and the excavation bottom. All confirmation samples were analyzed for TPH-IR, and two confirmation samples were analyzed for BTEX and HVOCs. The south and east sidewalls required additional soil removal after the two corresponding sidewalls samples exceeded 100 mg/kg for TPH-IR. Following additional soil removal, acceptable TPH results were obtained for all sidewalls and the excavation bottom. BTEX compounds were not detected, and one HVOC compound, methylene chloride, was detected at very low concentrations. The analytical results for the Tank Nos. 5 and 6 confirmation soil samples are summarized in Table 3-17.

AST No. 7

Former AST No. 7 was installed in an above ground vault. Based on the results of field screening and laboratory testing for TPH, underlying soil was excavated only to a depth of approximately 3 feet bgs. One confirmation soil sample, designated T7BOT, was collected from the bottom of the resulting excavation and analyzed by ASC for TPH-IR. The TPH-IR result was below the MDE TPH cleanup standard of 100 mg/kg. The analytical result for sample T7BOT is provided in Table 3-18.

UST No. 9

Soil samples were collected for field TPH analysis and off-site laboratory testing by ASC during excavation at the former location of UST No. 9. Confirmation soil samples were collected for the four excavation sidewalls and the excavation bottom. All five confirmation samples were analyzed for TPH-IR. The laboratory TPH-IR concentration for the excavation bottom sample, collected at approximately 10 feet bgs, measured 108 mg/kg which marginally exceeds the MDE TPH cleanup standard. Additional soil and rock were removed from the floor of the excavation down to the practical limit of the excavation, i.e., competent bedrock. Acceptable TPH results were obtained for all excavation sidewalls. The analytical results for the UST No. 9 confirmation soil samples are summarized in Table 3-19.

Tank No. 10

Soil samples were collected for field TPH analysis and off-site laboratory testing by ASC during excavation at the former location of the administration building UST. Confirmation samples from the excavation sidewalls and floor were analyzed for TPH-IR. Acceptable TPH results, below 100 mg/kg, were obtained for all confirmation samples. The analytical results for the confirmation soil samples are summarized in Table 3-20.



Administration Building Tank

Soil samples were collected for field TPH analysis and off-site laboratory testing by ASC during excavation at the former location of the administration building UST. Confirmation soil samples were analyzed for TPH-IR. Acceptable TPH results were obtained for all confirmation samples. The analytical results for the confirmation soil samples are summarized in Table 3-21.

3.3.3 Separator Pit - Outflow Swales

3.3.3.1 Sampling Methodology

Based on the results of investigative sampling and analysis, and ongoing field screening for TPH, approximately 3 to 4 feet of soil were removed along the entire length of the oil separator pit outflow swale. In addition, the berm and headwall structure at the upgradient end of the outflow swale were excavated and transported to Site 1. Confirmation samples were collected along the entire length of the outflow swale and in the former location of the berm, between the head wall and the oil separator pit.

3.3.3.2 Analytical Results

Confirmation soil samples, collected at nine locations, were analyzed by ASC for TPH-IR and TCL pesticides. Due to elevated PHC and pesticide concentrations at three locations, additional soil was removed from the outflow swale. A second round of confirmation samples was collected at the three locations. All sampling results were below levels of concern following the second round of soil confirmation sampling. Results are summarized in Table 3-22.

3.3.4 Separator Pit - Floor

3.3.4.1 Sampling Methodology

During the soil removal action in the oil separator pit area, soil samples were collected and screened in the field using a TPH analyzer. Screening results that indicated TPH at a level greater than or equal to 100 mg/kg were used to determine areas requiring additional soil removal. Soil samples having a TPH concentration significantly less than 100 mg/kg (based on a factor of safety) were analyzed at the designated off-site laboratory to confirm that TPH levels were well below 100 mg/kg. The locations of confirmation samples collected from the separator pit floor are shown on Figure 5.

3.3.4.2 Analytical Results

In addition to intensive field screening of samples using the TPH analyzer, 25 confirmation samples were collected from the floor of the separator pit for TPH-IR analysis by ASC. All samples contained less than the MDE TPH cleanup standard of 100 mg/kg. The analytical results are summarized in Table 3-23A.

Four of the twenty-five confirmation samples, D29C, D33C, D46C, and D47C, were analyzed for HVOs (USEPA Method 8010), BTEX/aromatics (USEPA Method 8020), and TCL pesticides and PCBs (USEPA Method 8080), and TPH-IR (USEPA Method 418.1M). All detected compounds were below established cleanup levels.

The analytical results for the separator pit floor confirmation soil sampling are summarized in Table 3-23B.

3.3.5 Separator Pit - Containment Berms

3.3.5.1 Sampling Methodology

During the soil removal action for the berms surrounding the oil separator pit area, soil samples were collected and screened in the field using a TPH analyzer. Screening results that indicated TPH at a level greater than or equal to 100 mg/kg were used to determine areas requiring additional soil removal using a TPH analyzer. Soil samples having a TPH concentration significantly less than 100 mg/kg (based on a margin of safety) were tested at ASC and AEN to confirm that TPH levels were significantly below 100 mg/kg. The locations of confirmation samples collected from the separator pit berm area are shown on Figure 5.

3.3.5.2 Analytical Results

Thirty-five confirmation samples were collected from the berms of the separator pit for TPH-IR analysis. Additional soil was removed where sample locations exceeded the MDE TPH cleanup standard of 100 mg/kg. These locations were then resampled and analyzed to obtain a TPH result less than 100 mg/kg. The analytical results are summarized in Table 3-24A.

Two confirmation samples, BERM36 and BERM41, were analyzed for HVOCs (USEPA Method 8010), BTEX/aromatics (USEPA Method 8020), TCL pesticides (USEPA Method 8080), and TPH-IR (USEPA Method 418.1M). All detected compounds were below established cleanup levels.

The analytical results for the containment berm soil confirmation sampling are summarized in Table 3-24B.

3.3.6 Separator Pit - Water

Two unfiltered water samples, PIT H2O NW and PIT H2O SW, were collected from water standing in the northwest and southwest corners of the separator pit excavation. The two water samples were collected after pumping standing water and groundwater recharge from the two corner areas. The samples were analyzed for TPH-IR and the full TCL and TAL with the exception of cyanide.

DDT was detected at a concentration of 0.001 mg/L in the water sample from the southwest corner of the separator pit. The same sample was determined to have a TPH concentration of 2.29 mg/L. VOCs and SVOCs were all below minimum detection limits for both samples. The analytical results for the two separator pit water samples are summarized in Table 3-25. On-site treatment of water removed from the separator pit is discussed in Section 3.4.2.

3.3.7 Concrete Vault Area

3.3.7.1 Sampling Methodology

During the removal of the two concrete oil/water separator vaults, soils surrounding the vaults were determined to be PHC-impacted based on field TPH screening and visual inspection. On 11, 12, and 16 January 1995, following the removal of PHC-impacted soils, 11 confirmation soil samples were collected from the excavation sidewalls between 0 and 4 feet above the water table. The water table was located at a depth of approximately 10 feet bgs. The locations of confirmation samples collected from the separator vault excavation are shown on Figure 5.

Competent bedrock was encountered approximately 1 to 2 feet above the water table over more than half of the excavation floor. Over the remaining floor area, competent bedrock was encountered from 0 to 2 feet below the water table. A composite soil sample (designated SV04FL) consisting of gray-colored soil was collected from the floor of the excavation at the soil and bedrock interface (above the water table).

3.3.7.2 Analytical Results

All 12 soil samples were analyzed by AEN for TPH-IR, and 2 of the 12 samples were also analyzed by AEN for BTEX (USEPA Method 8020). Sample SV04FL, composed of soil remaining over the bedrock floor, was determined to have a TPH concentration of 3,100 mg/kg. TPH-IR analysis of sample SV10W, composed of soil near decomposed sidewall bedrock, measured 390 mg/kg. Additional soil and rock were removed from the floor and sidewall of the excavation to the practical limit of excavation (i.e., competent bedrock). Soil samples SV09W and SV11W were analyzed by AEN for BTEX; BTEX compounds were detected at low concentrations.

Analytical results for soil samples collected in the separator vault excavation are summarized in Table 3-26.

3.3.8 Pesticide-Impacted Wetlands

3.3.8.1 Sampling Methodology

Based on the results of the investigative sampling in the pesticide-impacted wetland located northeast of the separator pit, soils were removed from areas containing pesticides above USEPA risk-based standards for residential soils. On 12 December 1994, a confirmation soil sample, designated H50C, was collected at one location near the separator pit and forwarded to AEN. On 6 January 1995, 18 additional soil confirmation samples were collected, and shipped to ASC. All samples from the pesticide-impacted wetlands were analyzed for TCL pesticides (USEPA Method 8080). The 19 confirmation samples were assigned sample numbers H50C through H68C. The locations are indicated on Figure 5.

Based on the results of confirmation samples collected on 6 January 1995, additional soils were removed to a depth of approximately 4 feet in the area of seven sampling locations that still contained concentrations of pesticides above USEPA risk-based standards for residential soils. On 25 January 1995, following the removal of additional soil, seven soil samples were collected and analyzed for TCL pesticides. All seven soil samples were below USEPA risk-based concentrations for residential soils. The second round confirmation samples were H54C2, H56C2, H61C2, H65C2, H66C2, H67C2, and H68C2.

3.3.8.2 Analytical Results

Sample H50C, collected on 12 December 1994, was below USEPA risk-based levels for all pesticide compounds. The seven of 19 samples collected on 6 January 1995 that exceeded USEPA risk based concentrations contained DDD to 8.29 mg/kg, DDE to 1.91 mg/kg, and DDT to 18.1. The analytical results for all confirmation samples collected in the pesticide-impacted wetlands are summarized in Table 3-27.

3.4 QUALITY CONTROL DATA

3.4.1 Laboratory Duplicate Analysis

The duplicate samples collected at Site 2 were split samples. Duplicate RPD results were generally better than for Site 1, as is evidenced by the lower RPD found for most analyses. The equation for calculating

RPD is given in Section 2.4.1. In most cases, the sample concentrations were so small that the RPD calculation did not provide a meaningful result. For example, sample D33C and its duplicate contained benzene concentrations at 2 micrograms per kilogram ($\mu\text{g/kg}$) [parts per billion (ppb)] and 0.1 $\mu\text{g/kg}$, respectively. The RPD between these two results is 180 percent, but the difference is only 1.9 $\mu\text{g/kg}$. This same difference for samples with an average concentration [i.e., $(S_1 + S_2)/2$] of 1.05 milligrams per kilogram (mg/kg) [parts per million (ppm)] would result in an RPD of 0.18 percent. Thus, RPDs for two samples at high concentrations are affected less by differences in concentration than two samples at low concentrations.

When both non-pesticide sample concentrations were determined to be greater than 1 mg/kg , an average RPD of 17 percent was obtained, while concentrations less than 1 mg/kg had an average RPD of 77 percent. The RPD for pesticide analyses with both concentrations greater than 1 mg/kg was greater than 17 percent, which may have been due to the high organic content of the soil limiting extraction of the pesticides from the soil, or interfering with the detection of pesticides in the gas chromatograph.

The comparative analytical results and RPD values for Site 2 samples are provided in Tables 3-28A, 3-28B, and 3-28C.

3.4.2 Water Treatment

Temporary water treatment was conducted by OHM at Site 2 beginning in September 1994 and concluded in December 1994. The temporary water treatment system consisted of three bag filter units, one sand filter unit, and one granular activated carbon unit. The system was designed based on the results of a "worst case" liquid sample, designated OWS-1, obtained from the separator pit. The analytical results for OWS-1 are summarized in Table 3-12. Further discussion with regard to OWS-1 is presented in Section 3.2.10. The system was demobilized on 20 December 1994. The water treatment unit was used to treat standing water collected from the separator pit.

One influent and one effluent sample was collected during each day the water treatment system was in operation. Each sample was typically analyzed for TPH-IR and BTEX. In addition, both influent and effluent samples were analyzed for pesticides and PCBs on a weekly basis, and HVOCs less frequently. With the exception of TPH, the treatment system effectively eliminated all chemical compounds detected in the influent. TPH was substantially reduced by the treatment system in every instance.

The treated water was staged in interim 12,000-gallon holding pools pending receipt of the analytical data. Upon receipt of analytical data, the treated water was transferred to a 1,000,000-gallon treated water storage tank (ModuTank). The treated water was then used for on-site dust control in accordance with written MDE authorization.

Analytical results for water treatment samples are summarized in Table 3-29. The laboratory analytical reports are provided in Appendix F.

3.4.3 Solidification

Soils excavated at Site 2 from the separator pit generally required the addition of solidification or bulking agents to address potential free liquids. In addition, the MDE required that potentially saturated materials removed from Site 2 be subjected to paint filter testing (USEPA Method 9095) prior to transport. To comply with the MDE testing requirement, OHM conducted paint filter testing through 14 October 1994 on all materials excavated at Site 2 that potentially contained free liquids. All samples passed the paint filter test. The paint filter test results are summarized in Table 3-30.

3.5 MATERIAL TESTING DATA

3.5.1 Soil Materials - Geotechnical Properties

Geotechnical laboratory testing was conducted for both on-site and imported materials to identify their physical properties and suitability for specific construction applications. The material testing laboratory for the project was FWA Geosciences.

FWA Geosciences tested on-site soils obtained from borrow pit areas established by OHM, on-site soil removed from the Wetland Mitigation Area, and both the fine mason and utility sands obtained from York Building Products, Inc. of Perryville, Maryland. Geotechnical tests performed by FWA Geosciences included direct shear (ASTM D3080), Atterberg Limits (ASTM D4318), grain size (ASTM D422), and soil classification (ASTM D2487).

The geotechnical test reports prepared by FWA Geosciences are provided in Appendix H.

3.5.2 Soil Materials - Chemical Properties

Imported earthen construction materials were sampled and analyzed prior to delivery on site to verify that specific hazardous constituents were not present in the materials. Each material was tested for PCBs and all RCRA TCLP parameters, VOCs, SVOCs, pesticides, herbicides, and metals. The following imported materials were sampled and tested:

- Leaf compost, commercially referred to as "Leafgro," used in producing topsoil
- Sand fill from York Building Products, Inc. (excavation fill at Site 2)
- Bank run fill from Cecil Sand & Gravel, Inc. of Perryville, Maryland (excavation fill at Site 2).

Leaf compost, commercially referred to as Leafgro, was required for mixing with non-organic on-site soils to generate a topsoil layer in restored wetland areas including Site 2 and the Wetland Mitigation Area adjacent to the reservoir. In addition, the leaf compost was mixed with wood chips generated during clearing activities to enhance the decomposition of the wood chips into a topsoil suitable for use on the constructed landfill cap surface.

Prior to initiating bulk deliveries of leaf compost, a sample was obtained on 17 November 1994 and delivered to AEN for full TCLP analyses. A second sample was collected on 1 December 1994 and delivered to the testing laboratory for PCB analysis. The results for the sample, designated LEAFGRO on Table 2-8, were all below detection limits except for 2,4 D, a herbicide, which was detected below maximum contaminant standards. Based on the results of the analytical testing, the leaf compost material was imported on site for use in topsoil composting.

The analytical results for imported materials are summarized in Table 2-8. The laboratory analytical reports are provided in Appendix C.



3.5.3 Soil Materials - Agronomic Properties

Agronomic testing of the Site 2 topsoil mixture using the leaf compost was not performed as the mixture was established and approved for use by Environmental Quality Resources, Inc. (EQR) of Silver Spring Maryland, the wetland mitigation subcontractor.

4.0 WETLAND MITIGATION AREA SAMPLING AND ANALYSIS

4.1 MATERIAL TESTING DATA

Since the Wetland Mitigation Area did not constitute an environmental area of concern, investigative and confirmation sampling was not required, and only material testing was performed. The location of the Wetland Mitigation Area within NTCB is shown on Figure 1.

4.1.1 Soil Materials - Geotechnical Properties

Geotechnical testing of soils was not required at the Wetland Mitigation Area.

4.1.2 Soil Materials - Chemical Properties

Leafgro (leaf compost) was required for mixing with non-organic on-site soils to generate a topsoil layer in restored areas including Site 2 and the Wetland Mitigation Area adjacent to the NTCB reservoir. In addition, the leaf compost was mixed with wood chips generated during clearing activities to enhance the decomposition of the wood chips into a topsoil suitable for use on the constructed landfill cap surface at Site 1.

Prior to initiating bulk deliveries of Leafgro, a sample was provided by the Leafgro supplier on 17 November 1994 and delivered to the testing laboratory for full RCRA TCLP analyses. A second sample was collected on 1 December 1994 and delivered to AEN for PCB analysis. The results for the sample, designated LEAFGRO in Table 2-8, were all below detection limits, except for 2,4-D, a herbicide, which was detected well below the corresponding toxicity characteristic standard. Based on the results of the analytical testing, Leafgro was imported on site for use in topsoil composting.

4.1.3 Soil Materials - Agronomic Properties

Agronomic testing of the Wetland Mitigation Area topsoil mixture using the leaf compost was not performed as the mixture was established and approved for use by EQR of Silver Spring Maryland, the wetland mitigation subcontractor.

5.0 ANALYTICAL DATA REVIEW

5.1 INTRODUCTION

An analytical data review was performed by OHM to verify that all analytical procedures and results were acceptable based upon Quality Assurance/Quality Control (QA/QC) parameters set forth in USEPA SW-846. These requirements are specific to each analytical method performed by the testing laboratory. The primary objective of the data review was to confirm validity of analytical data generated for this project. The data review was performed by Dr. Michael J. Lacy, Ph.D., project chemist for OHM Field Analytical Services - Northeast Region.

The analytical data reports reviewed by OHM were generated by ASC and AEN. The data review entailed evaluation of confirmation and water treatment sample data generated using the following analytical methods:

- Pesticides (USEPA SW-846 Method 8080)
- TPH (USEPA Method 418.1)
- VOCs (USEPA SW-846 Methods 8010, 8020, and 8240)
- SVOCs (USEPA SW-846 Method 8270)
- Metals (USEPA SW-846 Method 6010, 7470, and 7740)
- TSS (USEPA Method 160.2).

5.2 DATA REVIEW

5.2.1 Soil Samples

The analytical data for 75 post-excavation soil samples were reviewed by OHM. This number of samples represents 42 percent of the post-excavation soil samples and 24 percent of the total number of soil samples. The completed analytical review forms are presented in Appendix I.

5.2.1.1 Pesticides

The pesticide analyses were generally acceptable. All holding times were met and detection limits were below the site action levels. No contamination was seen in any blank samples. Surrogate standards were usually within limits for both recovery and retention time (RT) shifts, although the samples collected 16 and 17 March 1995 had unacceptable tetrachloro-m-xylene (TCMX) RT shifts on the final standard run. Samples collected 17 and 20 March 1995 had unsatisfactory recoveries for TCMX with samples DC and DC1, and the recovery of decachlorobiphenyl was outside limits for sample EC2X.

Difficulties were often encountered during calibration and continuing calibration analyses. These usually entailed percent recoveries (%R) which were outside of the acceptable range, or deviations greater than 15 percent during continuing calibrations. The most extreme case of the second difficulty was seen in the data of samples collected 6 and 11 January 1995. Over a period of 6 days, one compound was unacceptable (>15 percent difference) in each of ten continuing calibrations of the primary analytical column. Over 7 days, 40 compounds were unacceptable in a total of six continuing calibrations. Even this case posed no problem with the accurate quantification of analytes, since quantification is based upon the primary column and the compounds out on the primary column were not present in the sample.

Matrix spike/spike duplicate (MS/SD) analyses were usually acceptable. In cases where %R or RPD failed for the MS/SD of a sample, it passed for the associated method blank spike. This normally indicates matrix interferences, and not errors in sample preparation or analytical techniques.

5.2.1.2 Total Petroleum Hydrocarbons

All TPH samples were analyzed within the method holding time. There were few problems associated with these analyses in general. The only difficulties which occurred were the failure to attain the required %R and RPD for matrix spikes. High contaminant concentrations in the sample used for MS/SD analysis was the sole cause of this problem. Calibrations and detection limits were met in all data sets.

5.2.1.3 Volatile Organic Compounds

All VOC samples were analyzed before holding times expired. Detection limits were below site clean-up levels. All surrogate standards were recovered at permissible levels from NTCB samples and laboratory method blanks. *Surrogate standards are added to all samples and laboratory blanks at the beginning of laboratory sample preparation.*

Blank analytical results were evaluated for the existence and magnitude of any contamination. Method blanks analyzed with the samples from NTCB contained methylene chloride, a frequent laboratory contaminant. The method blank for NTCB samples collected on 3 and 4 November 1994 contained methylene chloride, acetone, toluene, and xylenes.

Based on USEPA Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses, positive sample results are not reported unless the concentration of a compound in a sample collected in the field exceeds by ten times the amount detected in the blank. The "ten times" rule applies only to methylene chloride, acetone, toluene, 2-butanone, and common phthalate esters. For other compounds, i.e., xylenes, the reporting threshold is a sample concentration greater than five times that of the blank concentration. Since NTCB sample concentrations were less than the applicable factor for the compounds detected in blanks, positive results were not reported for NTCB samples for the aforementioned compounds.

The method blank for NTCB samples collected on 15 and 18 November 1994 contained 39 compounds. However, the ratio of NTCB sample concentrations to method blank concentrations for detected compounds did not exceed the applicable factor (five or ten). As a result, positive concentrations were not reported for the NTCB data corresponding to 15 and 18 November 1994.

Some calibration difficulties were encountered during the VOC sample analyses. The samples collected between 9 and 18 November 1994 appear to have been analyzed together, although they were sent to the testing laboratory as two sets of samples. Each set of VOC calibrations had three compounds outside acceptable levels on the initial and continuing calibration of 20 November 1994, and 17 compounds outside acceptable levels on the ending calibration. This should have no effect on the data set, since contaminant levels detected were very low (generally <10 µg/kg).

MS/SD analyses were acceptable overall. Specific problems occurred with %R and RPD of the samples collected on 15 and 18 November 1994, and 19 and 21 November 1994. Both of the method blank spikes for these sample sets were acceptable, indicating matrix effects and not laboratory error were the cause of the variations from acceptable levels.

5.2.1.4 Semivolatile Organic Compounds

All SVOC samples were extracted and analyzed within the appropriate holding times. Detection limits and calibration requirements were also met. SVOCs were not detected in the laboratory method blanks. Field rinsate blanks were not collected because disposable, dedicated sampling equipment was used during confirmation sample collection. All surrogate standard %Rs were acceptable as were all RPDs. The only analysis which was unacceptable was the matrix spike for the samples collected on 17 and 20 March 1995, where the %R for 4-nitrophenol and pentachlorophenol were high. Since these compounds were not encountered in these samples, the data is acceptable.

5.2.1.5 Metals

All metals samples were extracted and analyzed within the method holding times. Detection limits and calibrations were both acceptable. The method blank for 16 and 17 March 1995 contained lead but less than ten times the amounts found in the confirmatory samples. MS/SD samples for 16, 17, and 20 March 1995 had unacceptable recoveries of arsenic and antimony, respectively. Both of these metals had a post-digestion spike performed, whose %Rs were acceptable. This should not effect the validity of the data generated on these samples.

5.2.2 Aqueous Samples

Analytical data for six water treatment samples out of a total of 42 (14 percent) were included in this data review. The completed analytical review forms are provided in Appendix I. The results of the data review for aqueous (water treatment) samples are presented below.

5.2.2.1 Pesticides

A review of the available data on the analysis of water treatment samples indicates no appreciable deficiencies in the pesticide data. MS/SD analyses were not performed on the samples analyzed due to insufficient sample being available. The batch QC sample, a method blank spike, had acceptable recoveries for each of the spike compounds. This indicates that the preparation and analyses of the samples was adequate.

5.2.2.2 Total Petroleum Hydrocarbons

No appreciable inadequacies in the TPH data were indicated upon review of the available data from the analyses of water treatment samples. MS/SD analyses were not performed on the samples analyzed due to insufficient sample availability. The batch QC sample, a method blank spike, had acceptable recoveries for each of the spike compounds. This indicates that the preparation and analyses of the samples was acceptable.

5.2.2.3 Volatile Organic Compounds

Analysis of the water treatment samples for VOCs was performed in an acceptable manner. All parameters reviewed were generally within acceptable limits, including MS/SD analyses. The method blank spike analyses were within limits for all analyses, indicating any variation from acceptable limits for %R of RPD were due to the sample matrix, not the preparative and analytical techniques employed.



5.3 CONCLUSION

Overall, it appears the data generated by ASC and AEN is acceptable. While some errors were determined to be present, none of these errors were found to invalidate any of the data sets reviewed. The acceptability of the data cannot be extrapolated to unreviewed data reports. However, each data report is reviewed and approved for release by the laboratory QA/QC officer. The data review by OHM is intended only to confirm the effectiveness of the laboratory QA/QC process by selected review of data reports.

6.0 CONCLUSIONS

With the completion of the removal action by OHM at NTCB, the following conclusions are reasonable based on investigative and confirmation analyses and CQC testing performed between July 1994 and June 1995.

6.1 SITE 1 - OLD LANDFILL AREA

- The test pit investigation established the extent of the debris, demolition rubble, and similar materials located outside the pre-determined limits of the landfill cap to the satisfaction of the MDE and EFA-Chesapeake.
- Laboratory analysis of seep liquids found low but detectable concentrations of dieldrin (pesticide), acetone (common laboratory cleaning agent), and metals. Aluminum, arsenic, barium, beryllium, manganese, molybdenum, and vanadium were present in apparently elevated concentrations in one Seep B sample collected before installation of the landfill cap.
- Investigative sediment and soil samples were all determined to be non-hazardous.
- Visible debris, demolition rubble, and similar materials outside of the future landfill cap limits were excavated and relocated under the cap. Analytical results for post-excavation sampling performed following the removal action northwest of the landfill cap show that these areas have been remediated to the satisfaction of the MDE and EFA-Chesapeake. Low but detectable concentrations of six pesticides, four VOCs, and various metals were detected in post-excavation samples. The removal action was advanced to the maximum practical limit possible without adversely affecting the stability and public safety of the adjacent Maryland Highway 276.
- Material testing results indicated the various imported materials were within specifications, and were not chemically contaminated.
- The CQC data indicated that various landfill cap materials (soils and geosynthetics) were installed satisfactorily.

6.2 SITE 2 - FIREFIGHTER TRAINING AREA

- Paint filter testing performed on the excavated and solidified materials indicated that the materials were sufficiently solidified with respect to free liquids prior to transport to the Site 1 landfill.
- Confirmation sampling results indicate that Site 2 was remediated to soil clean-up goals set forth by the MDE and EFA-Chesapeake. Where petroleum hydrocarbons were detected near bedrock, soils were removed to the practical limits of excavation (i.e., competent bedrock).
- In the oil/water separator vault excavation, soils contaminated with petroleum hydrocarbons were removed to soil cleanup goals for TPH or to competent bedrock, whichever was encountered first. Confirmation sampling results were used above the water table to determine the limits of excavation. Since collection of soil samples below the water table is



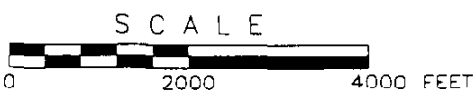
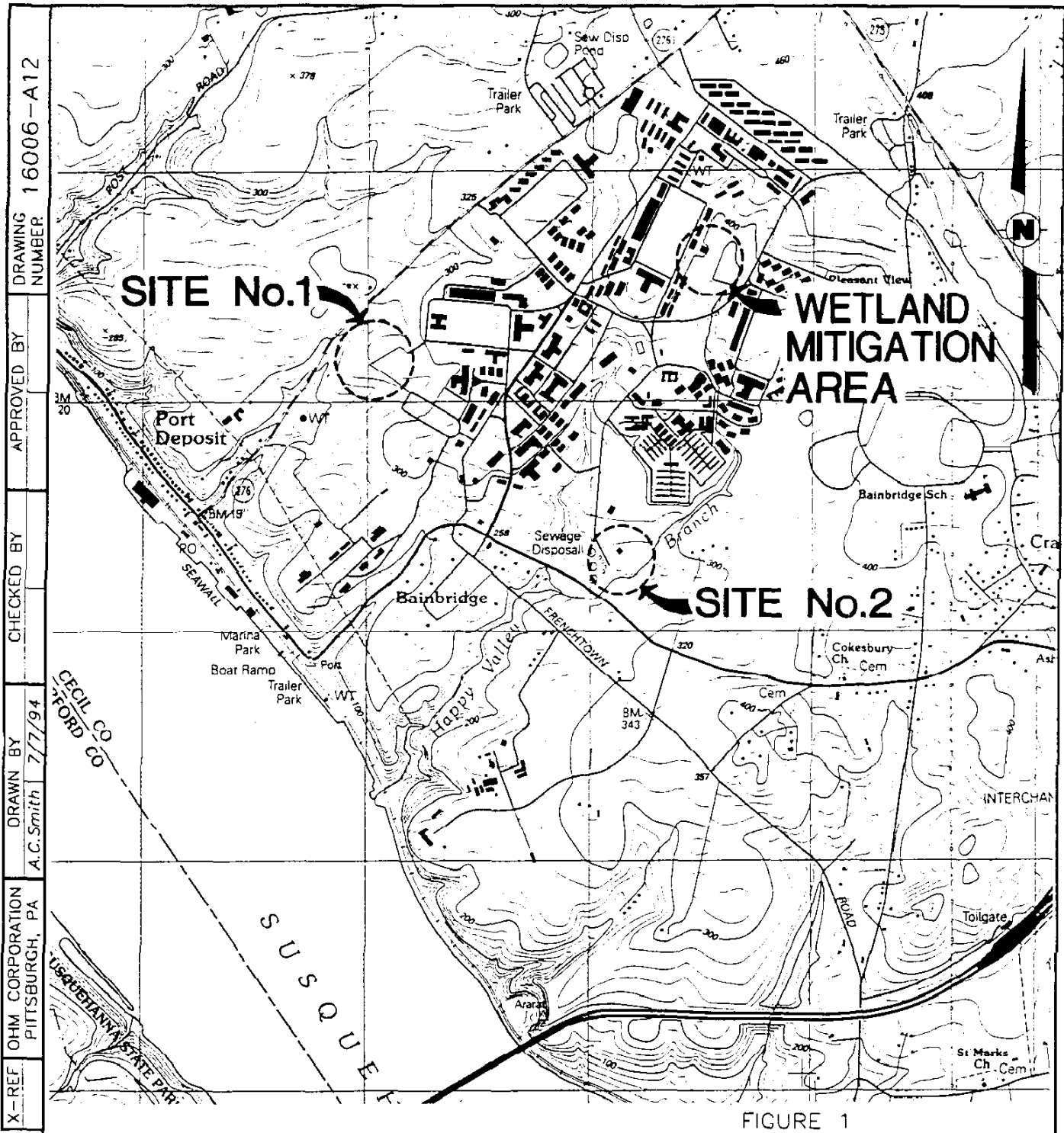
not an accepted practice, contaminated soils extending below the water table were removed to competent bedrock without confirmation soil sampling.

- Collected waters treated on site were confirmed as being treated to the satisfaction of the MDE and EPA-Chesapeake prior to use for dust control.

6.3 WETLAND MITIGATION AREA

- Material testing of imported leaf compost indicated that the material was not chemically contaminated.

FIGURES



LEGEND:

- 1. SITE NO.1: OLD LANDFILL AREA
- 2. SITE NO.2: FORMER FIREFIGHTER TRAINING AREA

REFERENCE:

U.S.G.S. 7.5 MIN TOPOGRAPHIC MAP OF HAVRE DE GRACE, MD QUADRANGLE, DATED: 1953, PHOTOREVISED 1985.

FIGURE 1

PROJECT VICINITY MAP
 REMEDIAL CONSTRUCTION ACTIVITIES
 NAVAL TRAINING CENTER - BAINBRIDGE
 PORT DEPOSIT, MARYLAND

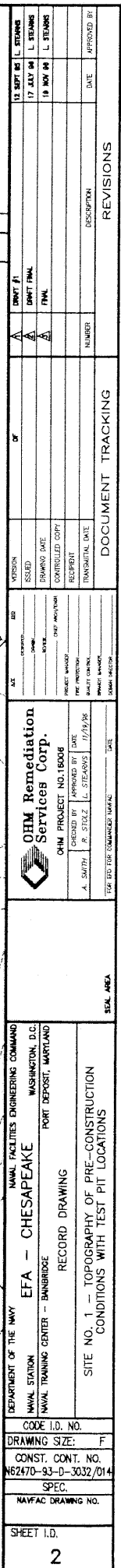
PREPARED FOR

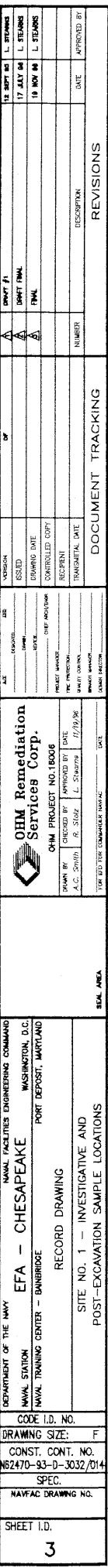
DEPARTMENT OF THE NAVY
 CHESAPEAKE DIVISION
 NAVAL FACILITIES ENGINEERING COMMAND
 WASHINGTON, D.C.





**OHM Remediation
 Services Corp.**

X-REF OHM CORPORATION PITTSBURGH, PA
 DRAWN BY A.C. Smith 7/7/94
 CHECKED BY
 APPROVED BY
 DRAWING NUMBER 16006-A12
 PLOT SCALE: 1" = 1 MILE





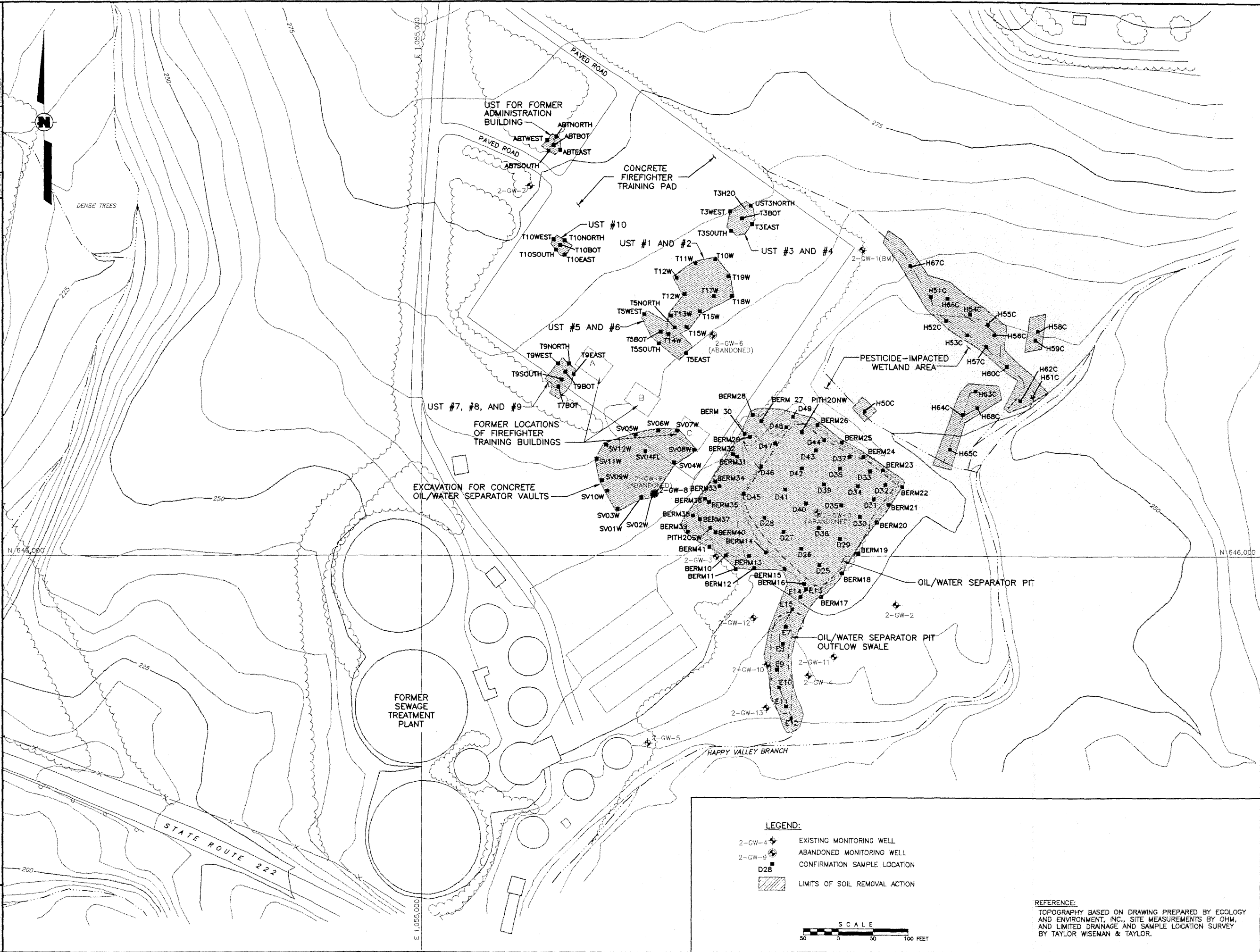


- 2-GW-2  EXISTING MONITORING WELL
2-GW-8  ABANDONED MONITORING WELL (BY OHM)
H15 OHM SAMPLE LOCATION (LABORATORY ANALYSIS)



REFERENCE:
TOPOGRAPHY BASED ON DRAWING PREPARED BY ECOLOGY
& ENVIRONMENT, INC., SITE MEASUREMENTS BY OHM,
AND LIMITED DRAINAGE AND SAMPLE LOCATION SURVEY
BY TAYLOR WISEMAN & TAYLOR.

[illegible]



LEGEND:

- 2-GW-4 EXISTING MONITORING WELL
- 2-GW-9 ABANDONED MONITORING WELL
- D28 CONFIRMATION SAMPLE LOCATION
- LIMITS OF SOIL REMOVAL ACTION



REFERENCE:
TOPOGRAPHY BASED ON DRAWING PREPARED BY ECOLOGY AND ENVIRONMENT, INC., SITE MEASUREMENTS BY OHM, AND LIMITED DRAINAGE AND SAMPLE LOCATION SURVEY BY TAYLOR WISEMAN & TAYLOR.

13 DEC 84 L. STANG		18 NOV 84 L. STANG		DATE		APPROVED BY	
ADDED SAMPLE LOCATIONS		FINAL		NUMBER		DESCRIPTION	
BR		DATE		DATE		DATE	
OHM Remediation Services Corp.		OHM PROJECT NO. 16006		DATE		DATE	
DRAWN BY		CHECKED BY		APPROVED BY		DATE	
A.C. Smith		R. Stolz		L. Stang		1/19/96	
FOR USE BY CONTRACTOR		DATE		DATE		DATE	
DEPARTMENT OF THE NAVY		NAVAL FACILITIES ENGINEERING COMMAND		WASHINGTON, D.C.		PORT DEPOSIT, MARYLAND	
NAVAL STATION		EFA - CHESAPEAKE		RECORD DRAWING - SITE NO. 2		CONFIRMATION SAMPLING LOCATIONS	
NAVAL TRAINING CENTER - BANBRIDGE		CODE I.D. NO.		DRAWING SIZE: F		CONST. CONT. NO.	
		N62470-93-D-3032/014		SPEC.		NAVAC DRAWING NO.	
		SHEET I.D.		5			

TABLES

LIST OF ACRONYMS

B	-	Detected in Blank
CCR	-	Contractor Closeout Report
D,H	-	Contains Diesel Range and Heavier Petroleum Hydrocarbons
E	-	Effluent
GC	-	Gas Chromatograph
I	-	Influent
IR	-	Infrared Spectrometer
J	-	Estimated Concentration
<MDL	-	Below Minimum Detection Limit
MS	-	Mass Spectrometer
NA	-	Not Analyzed for Parameter
ND	-	No Detection for Parameter
NS	-	No Standard
PCB	-	Polychlorinated Biphenyls
PPE	-	Personal Protective Equipment
RCRA	-	Resource Conservation and Recovery Act
RPD	-	Relative Percent Difference =

$$RPD = \frac{|S_1 - S_2|}{[(S_1 + S_2) / 2]} * 100$$

where S_1 and S_2 are analytical results for the sample of interest and its duplicate.

SVOC	-	Semivolatile Organic Compound
TAL	-	Target Analyte List
TCL	-	Target Compound List
TCLP	-	Toxicity Characteristic Leaching Procedure
TPH	-	Total Petroleum Hydrocarbons
UST	-	Underground Storage Tank(s)
VOC	-	Volatile Organic Compound
(####)	-	EPA Method Number

Only compounds detected above minimum detection limits are shown on the table.

ANALYTICAL SUMMARY TABLE 2-1

**SITE 1: LANDFILL DELINEATION SEDIMENT SAMPLING AND ANALYSIS
NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND
OHM PROJECT NO. 16006**

<i>Sample No.:</i>	<i>TP020</i>
<i>Date:</i>	<i>07/18/94</i>
Nitrate as N (mg/kg)	0.064
<i>RCRA TCLP Metals Analysis (mg/L)</i>	
Arsenic	0.002
Barium	0.630
Cadmium	<0.001
Chromium	<0.006
Lead	0.088
Mercury	<0.00014
Selenium	<0.0013
Silver	<0.006

Notes:

Sample TP020 was collected from a test pit excavated at Site 1 near the western limit of the old landfill.

For discussion of Table 2-1, refer to Section 2.2.1 of CCR, Vol. 1.

ANALYTICAL SUMMARY TABLE 2-2

SITE 1: SEEPS A AND B LIQUID SAMPLING AND ANALYSIS NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND OHM PROJECT NO. 16006

	Location: Date:	Seep A 08/12/94	Seep B 08/12/94	Seep B2 06/15/95
Conventional Data				
Oil and Grease (mg/L)		<5.00	10.8	1.15
Sulfide, Total as S (mg/L)		<10.0	<10.0	<10.0
Chemical Oxygen Demand (COD) (mg/L)		1,030	1,530	20.8
Ammonia as N (mg/L)		61.5	86.0	0.212
Biochemical Oxygen Demand (BOD)		<24.0	<150	<3.00
Phenols (mg/L)		<0.100	<0.200	<0.065
Chromium, Hexavalent (mg/L)		<0.013	<0.250	<0.005
Flash Point, Seta Flash Degrees C		>93	>93	NA
Halogens, Total as CL %		<0.100	<0.100	0.50
Solids, Total Suspended (mg/L)		752	7,030	43
Solids, Total Volatile (mg/L)		370	4,410	187
pH (Electrode) std.		6.56	5.78	6.94
Cyanide, Total (mg/L)		<0.050	<0.050	<0.010
Hardness as CaCO ₃ (mg/L)		202	201	321
RCRA TCLP Herbicide Analysis, GC	<MDL			NA
RCRA TCLP Pesticide Analysis, GC	<MDL			NA
RCRA TCLP Metals Analysis (mg/L)				
Barium		0.153	0.648	0.090
Lead		<0.018	<0.018	0.004

**TABLE 2-2
(CONTINUED)**

<i>Location: Date:</i>	<i>Seep A 08/12/94</i>	<i>Seep B 08/12/94</i>	<i>Seep B2 06/15/95</i>
TAL Total Metals Analysis (mg/L)			
Aluminum	23.4	333	1.72
Antimony	<0.030	<0.030	<0.049
Arsenic	0.051	0.552	<0.002
Barium	0.579	6.97	0.067
Beryllium	0.007	0.037	<0.0007
Cadmium	<0.001	<0.001	<0.002
Calcium	78.8	216	88.6
Chromium	0.009	0.088	0.005
Cobalt	<0.004	1.11	<0.003
Copper	0.079	1.00	0.009
Iron	931	5,280	2.66
Lead	0.190	2.78	0.005
Magnesium	20.4	122	24.4
Manganese	11.7	30.3	1.05
Mercury	<0.0001	0.002	<0.001
Molybdenum	0.036	0.318	<0.005
Nickel	<0.01	0.272	0.065
Potassium	4.95	68.9	7.48
Selenium	<0.001	0.002	<0.001
Silver	<0.006	<0.006	<0.006
Sodium	14.7	26.9	7.37
Thallium	0.090	0.945	<0.0007
Vanadium	0.073	0.695	0.006
Zinc	0.217	3.23	0.038

**TABLE 2-2
(CONTINUED)**

<i>Location: Date:</i>	<i>Seep A 08/12/94</i>	<i>Seep B 08/12/94</i>	<i>Seep B2 06/15/95</i>
<i>TPH Analysis, IR (418.1) (mg/L)</i>			
TPH, IR	<0.714	<0.741	NA
<i>TPH Analysis, GC (8015/8100) (mg/L)</i>			
Light Hydrocarbons	NA	NA	<0.470
Medium Hydrocarbons	NA	NA	<0.064 B,J
Heavy Hydrocarbons	NA	NA	<0.002 B,J
<i>TCL Pesticide and PCB Analysis, GC (8080) (mg/L)</i>			
Dieldrin	<0.0001	0.0002	<0.0001
<i>TCL VOC Analysis, GC/MS (8240) (mg/L)</i>			
Acetone	0.014	0.017	0.005 B,J
<i>TCL SVOC Analysis, GC/MS (8270)</i>	<MDL		

Note:

For discussion of Table 2-2, refer to Section 2.2.2 of CCR, Vol. 1.

ANALYTICAL SUMMARY TABLE 2-3

SITE 1: LIQUID DISPOSAL PIT SOIL SAMPLING AND ANALYSIS NORTHERN LANDFILL AREA NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND OHM PROJECT NO. 16006

<i>Sample No.:</i> <i>Date:</i> <i>Depth:</i>		<i>NPIT</i> 10/08/94 0-1'
<i>RCRA Characteristics</i>		
Flash Point, Seta Flash Deg. C		> 60
Reactive Cyanide (mg/kg)		< 10.0
Reactive Sulfide (mg/kg)		25.0
pH (Electrode) Std.		6.06
<i>RCRA TCLP VOC Analysis, GC/MS</i>		< MDL
<i>RCRA TCLP SVOC Analysis, GC/MS</i>		< MDL
<i>RCRA TCLP Pesticide Analysis, GC</i>		< MDL
<i>RCRA TCLP Herbicide Analysis, GC</i>		< MDL
<i>RCRA TCLP Metals Analysis (mg/L)</i>		
Barium		0.582
Cadmium		0.008
Lead		0.078

Note:

For discussion of Table 2-3, refer to Section 2.2.3 of CCR, Vol. 1.

ANALYTICAL SUMMARY TABLE 2-4

SITE 1: LIQUID DISPOSAL PIT SOIL SAMPLING AND ANALYSIS SOUTHERN LANDFILL AREA NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND OHM PROJECT NO. 16006

<i>Sample No.: Date: Depth:</i>	<i>SPIT 10/08/94 0-1'</i>	<i>SPIT2 11/07/94 5-12'</i>
<i>Solid, Total %</i>	NA	55.1
<i>RCRA Characteristics</i>		
Flash Point, Seta Deg. C	> 60	NA
Reactive Cyanide (mg/kg)	< 10.0	NA
Reactive Sulfide (mg/kg)	25.0	NA
pH (Electrode) Std.	5.83	NA
<i>TPH Analysis, IR (418.1M) (mg/kg)</i>		
Petroleum Hydrocarbons	NA	190,000
<i>TCL VOC Analysis, GC/MS (8240) (mg/kg)</i>		
Ethylbenzene	NA	9.20 B
Methylene Chloride	NA	2.42 B
Toluene	NA	11.0 B
Xylenes	NA	45.0 B
<i>RCRA TCLP VOC Analysis, GC/MS</i>	<MDL	
<i>RCRA TCLP SVOC Analysis, GC/MS (mg/L)</i>		
4-Methylphenol	<0.100	1.90 J
<i>RCRA TCLP Herbicide Analysis, GC</i>	<MDL	
<i>RCRA TCLP Pesticide Analysis, GC</i>	<MDL	
<i>RCRA TCLP Metals Analysis (mg/L)</i>		
Arsenic	<0.023	1.090
Barium	0.141	1.570
Lead	1.13	0.464

Note:

For discussion of Table 2-4, refer to Section 2.2.4 of CCR, Vol. 1.

ANALYTICAL SUMMARY TABLE 2-5

**SITE 1: SAMPLING AND ANALYSIS OF RUBBLE LANDFILL SEDIMENT TRAP BERM
NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND
OHM PROJECT NO. 16006**

<i>Sample No.: Date:</i>	<i>IFG 03/15/95</i>
<i>Solid, Total %</i>	72.5
<i>TPH Analysis, GC (8015/8100)</i>	1,400 D,H

Note:

For discussion of Table 2-5, refer to Section 2.2.5 of CCR, Vol. 1.

ANALYTICAL SUMMARY TABLE 2-6A

SITE 1: NW LANDFILL MATERIAL REMOVAL COMPOSITE POST-EXCAVATION CONFIRMATION SAMPLES NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND OHM PROJECT NO. 16006

<i>Sample No.: Date: Depth:</i>	<i>AC 03/15/95 0-1'</i>	<i>BC 03/16/95 0-1'</i>	<i>CC 03/16/95 0-1'</i>	<i>DC 03/17/95 0-1'</i>	<i>EC 03/20/95 0-1'</i>	<i>FC 03/16/95 0-1'</i>
<i>Total Solids %</i>	87.4	83.2	79.3	80.4	82.1	77.8
<i>Total Cyanide, GC (9010) (mg/kg)</i>	<1.1	<1.2	<1.3	<1.2	<1.2	<1.3
<i>TCL Pesticide Analysis, GC (8080) (mg/kg)</i>						
4,4'-DDD	<0.0075	<0.002	0.016	<0.0041	<0.0079	0.0034 J
4,4'-DDE	<0.0075	<0.002	0.0021	<0.0041	<0.0079	0.0041 J
4,4'-DDT	0.007 J	<0.002	0.0025	<0.0041	<0.0079	0.005
<i>TCL SVOC Analysis, GC/MS (8270) (mg/kg)</i>						
bis(2-Ethylhexyl)phthalate	0.360 J	0.440	0.056 J	0.790	<0.400	0.300 J
Fluoranthene	0.170 J	0.110 J	0.090 J	<0.410	0.740	<0.400
Pyrene	0.150 J	0.110 J	0.100 J	<0.410	0.620	<0.400
<i>TAL Total Metals Analysis (mg/kg)</i>						
Aluminum	12,400	30,500	18,700	25,000	17,100	25,500
Antimony	<2.3	<2.4	<2.5	<2.5	<2.4	<2.6
Arsenic	0.75	<2.4	<2.5	5.9	1.5	0.85
Barium	61.8	114	154	74.8	76.9	120
Beryllium	0.85	2.1	1.7	0.71	0.71	0.97
Cadmium	<0.46	<0.48	<0.50	<0.50	<0.49	<0.51
Calcium	2,870	1,840	3,590	1,270	1,070	1,390
Chromium	14.9	10	19.4	24.7	10.3	29.7
Cobalt	6.5	9.7	14.3	8.2	6.9	6.8
Copper	10.9	21.0	20.1	13.9	11.7	16.5
Iron	19,100	32,500	27,300	26,200	16,400	40,400
Lead	15.3	17.1	48.6	11.4	21.5	22.4
Magnesium	1,880	2,330	4,250	2,870	2,510	2,800

**TABLE 2-6A
(CONTINUED)**

<i>Sample No.: Date: Depth:</i>	<i>AC 03/15/95 0-1'</i>	<i>BC 03/16/95 0-1'</i>	<i>CC 03/16/95 0-1'</i>	<i>DC 03/17/95 0-1'</i>	<i>EC 03/20/95 0-1'</i>	<i>FC 03/16/95 0-1'</i>
Manganese	354	227	843	228	283	448
Mercury	<0.11	<0.12	0.14	<0.12	<0.12	<0.13
Nickel	6.4	7.1	11.1	12.5	4.4	11.1
Potassium	1,030	3,190	2,080	1,740	2,870	1,630
Selenium	<0.57	<0.60	<0.63	<0.62	<0.61	0.89
Silver	<0.92	<0.96	<1.0	<1.00	<0.97	<1.0
Sodium	<114	166	182	<124	<122	228
Thallium	<0.57	<0.60	<0.63	1.2	<0.61	0.82
Vanadium	22.2	21.4	34.5	35.2	22.9	42.7
Zinc	35.3	62.7	67.8	35.9	38.0	52.2

Note:

For discussion of Table 2-6A, refer to Section 2.3.1 of CCR, Vol. 1.

ANALYTICAL SUMMARY TABLE 2-6B

**SITE 1: NW LANDFILL MATERIAL REMOVAL ACTION
DISCRETE POST-EXCAVATION CONFIRMATION SAMPLES
NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND
OHM PROJECT NO. 16006**

<i>Sample No.: Date: Depth:</i>	<i>3AC 03/15/95 0-1'</i>	<i>3BC 03/16/95 0-1'</i>	<i>ICC 03/16/95 0-1'</i>	<i>IDC 03/17/95 0-1'</i>	<i>IEC 03/20/95 0-1'</i>	<i>IFC 03/16/95 0-1'</i>
Total Solids %	84.4	82.9	80.6	78.5	81.1	79.7
Total Cyanide, GC (9010) (mg/kg)	<1.2	<1.2	<1.2	<1.3	<1.2	<1.2
TCL Pesticide Analysis, GC (8080) (mg/kg)						
Aldrin	<0.0039	<0.001	<0.001	<0.002	<0.002	0.0022
4,4'-DDD	0.0048 J	0.0054	0.0043	<0.004	<0.0041	0.0066
4,4-DDE	<0.0077	<0.002	0.0022	<0.004	<0.0041	<0.0039
4,4'-DDT	0.0054 J	<0.002	0.0029	<0.004	<0.0041	<0.0039
gamma-Chlordane (mg/kg)	<0.0039	<0.001	<0.001	<0.002	<0.002	0.0023
beta-BHC (mg/kg)	<0.0039	<0.001	0.0016	<0.002	<0.002	<0.002
TCL VOC Analysis, GC/MS (8240) (mg/kg)						
Methylene Chloride	0.027 B	0.018 B	0.034 B	0.011 J,B	0.011 J,B	0.011 J,B
Acetone	<0.012	<0.012	0.085	<0.013	0.013	0.042
Tetrachloroethene	0.0052 J	0.015	0.0076 J	0.0079 J	0.014	0.0064 J
TCL SVOC Analysis, GC/MS (8270)	<MDL					
TAL Total Metals Analysis (mg/kg)						
Aluminum	12,700	9,530	17,100	17,600	14,800	13,700
Antimony	<2.4	<2.4	<2.5	<2.5	<2.5	<2.5
Arsenic	2.4	<0.48	<2.5	3.9	2.3	<0.50
Barium	62.3	85.2	146	101	85.1	88.1
Beryllium	0.88	0.81	1.6	0.97	0.82	1.1
Cadmium	<0.47	<0.48	<0.50	<0.51	<0.49	<0.50
Calcium	2,580	2,990	3,580	2,210	1,210	1,340
Chromium	24	10.7	17.8	16.8	11.1	7.3
Cobalt	8.5	6.9	12.2	9.5	8.8	5.5

**TABLE 2-6B
(CONTINUED)**

<i>Sample No.: Date: Depth:</i>	<i>3AC 03/15/95 0-1'</i>	<i>3BC 03/16/95 0-1'</i>	<i>1CC 03/16/95 0-1'</i>	<i>1DC 03/17/95 0-1'</i>	<i>1EC 03/20/95 0-1'</i>	<i>1FC 03/16/95 0-1'</i>
Copper	23.6	13.5	17.5	15.5	19.0	23.1
Iron	45,500	14,800	24,300	23,400	19,100	23,600
Lead	142	29.3	35.7	30.5	13.7	47.7
Magnesium	2,300	2,160	3,090	2,850	2,770	3,100
Manganese	392	342	934	405	322	415
Mercury	<0.12	<0.12	0.15	<0.13	<0.12	<0.13
Nickel	9.7	6.0	9.9	8.3	4.8	4.3
Potassium	1,480	1,080	1,570	2,170	2,980	2,570
Selenium	<0.59	<0.60	<0.62	<0.64	<0.62	<0.63
Silver	<0.95	<0.97	<0.99	<1.0	<0.99	<1.0
Sodium	123	148	163	130	<123	294
Thallium	<0.59	<0.60	<0.62	<0.64	<0.62	<0.63
Vanadium	33.8	18.6	29.8	38.8	29.4	16.6
Zinc	56.6	42.8	60.1	48.3	33.9	89.1

Note:

For discussion of Table 2-6B, refer to Section 2.3.1 of CCR, Vol. 1.

ANALYTICAL SUMMARY TABLE 2-6C

SITE 1: SAMPLING AND ANALYSIS OF COAL CLINKERS
NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND
OHM PROJECT NO. 16006

<i>Sample No.:</i> <i>Date:</i> <i>Depth:</i>	<i>C1</i> <i>03/20/95</i> <i>1-2'</i>
<i>RCRA TCLP SVOC Analysis, GC/MS</i>	<MDL
<i>RCRA TCLP Metals Analysis</i>	<MDL

Note:

For discussion of Table 2-6C, refer to Section 2.3.2 of CCR, Vol. 1.

ANALYTICAL SUMMARY TABLE 2-7

SITE 1: QUALITY ASSURANCE DUPLICATE ANALYSIS NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND OHM PROJECT NO. 16006

<i>Sample No.: Date:</i>	<i>IDC 03/17/95</i>	<i>DUP NWI 03/17/95</i>	<i>RPD %</i>
<i>TCL VOC Analysis, GC/MS (8240) (mg/kg)</i>			
Acetone	< 13	22	> 51
<i>TCL SVOC Analysis, GC/MS (8270) (mg/kg)</i>			
2-Methylphenol	< 0.410	1.10	> 91
4-Methylphenol	< 0.410	2.00	> 132
<i>TAL Total Metals Analysis (mg/kg)</i>			
Aluminum	17,600	20,900	17.1
Arsenic	3.9	4.4	12
Barium	101	102	0.5
Beryllium	0.97	1.1	12.6
Calcium	2,210	2,750	21.8
Chromium	16.8	19.6	15.4
Cobalt	9.5	9.0	5.4
Copper	15.5	16.3	5.0
Iron	23,400	25,000	6.6
Lead	30.5	26.0	15.9
Magnesium	2,850	3,100	8.4
Manganese	405	445	9.4
Nickel	8.3	10.5	23.4
Potassium	2,170	2,290	5.4
Sodium	130	< 125	> 3.9
Vanadium	38.8	36.2	6.9
Zinc	48.3	59.6	20.9

Notes:

For discussion of Table 2-7, refer to Section 2.4.1 of CCR, Vol. 1.

ANALYTICAL SUMMARY TABLE 2-8

IMPORTED COMPOST AND BORROW SAMPLING AND ANALYSIS NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND OHM PROJECT NO. 16006

<i>Sample No.: Date:</i>	<i>LEAFGROW 11/17/94</i>	<i>YORKI 12/15/94</i>	<i>CECIL 01/19/95</i>	<i>CLAY0421 04/21/95</i>	<i>CROUSE1 07/31/95</i>	<i>SELECT1 07/31/95</i>
<i>RCRA Characteristics</i>						
Corrosivity pH	NA	NA	4.9	5.5	6.1	5.8
Flash Point °F	NA	NA	NA	> 203	> 203	>203
Reactive Cyanide (mg/kg)	NA	NA	NA	<2	<2	<2
Reactive Sulfide (mg/kg)	NA	NA	NA	48	<40	<40
<i>TPH Analysis, IR (418.1M) (mg/kg)</i>	NA	NA	NA	NA	<17	<16
<i>TPH Analysis, GC (8015) (mg/kg)</i>	NA	NA	NA	<20	NA	NA
<i>PCB Analysis, GC (8080)</i>	<MDL					
<i>RCRA TCLP VOC Analysis, GC/MS</i>	<MDL					
<i>RCRA TCLP SVOC Analysis, GC/MS</i>	<MDL					
<i>RCRA TCLP Pesticide Analysis, GC</i>	<MDL					
<i>RCRA TCLP Herbicide Analysis, GC (mg/L)</i>						
2,4-D	0.00099	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
<i>RCRA TCLP Metals Analysis</i>						
Mercury	0.00027	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002

Note:

For discussion of Table 2-8, refer to Section 2.5.2 of CCR, Vol. 1.

ANALYTICAL SUMMARY TABLE 2-9

SITE 1: SAMPLING AND ANALYSIS OF PPE FOR DISPOSAL CHARACTERIZATION NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND OHM PROJECT NO. 16006

<i>Sample No.: Date:</i>	<i>PPE1 01/23/95</i>	<i>DRUM1 07/31/95</i>
RCRA Characteristics		
Corrosivity pH	7.6	NA
Flash Point °F	> 203	NA
Reactive Cyanide (mg/kg)	< 2	NA
Reactive Sulfide (mg/kg)	47	NA
TPH Analysis, IR (418.1M) (mg/kg)	19,000	74,000
BTEX VOC Analysis, GC (8020) (mg/kg)		
Toluene	NA	0.012
Ethylbenzene	NA	0.0084
Xylenes	NA	0.037
PCB Analysis, GC (8080)	< MDL	NA
Total Organic Halogen (9020) (mg/kg)	NA	< 1.57
RCRA TCLP VOC Analysis, GC/MS	< MDL	NA
RCRA TCLP SVOC Analysis, GC/MS	< MDL	NA
RCRA TCLP Pesticides Analysis, GC	< MDL	NA
RCRA TCLP Herbicides Analysis, GC	< MDL	NA
RCRA TCLP Metals Analysis	< MDL	NA

Note:

For discussion of Table 2-9, refer to Section 2.5.5 of CCR, Vol. 1.

ANALYTICAL SUMMARY TABLE 2-10

SAMPLING AND ANALYSIS OF VEGETATIVE DEBRIS NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND OHM PROJECT NO. 16006

<i>Sample No.: Date:</i>	<i>1WPC 03/16/95</i>	<i>2WPC 03/16/95</i>	<i>051795-1 5/18/95</i>
<i>Solids, Total %</i>	51.7	64.9	NA
<i>RCRA Characteristics</i>			
Corrosivity pH	7.8	6.4	NA
Flash Point °F	> 203	> 203	NA
Reactive Cyanide (mg/kg)	< 2	< 2	NA
Reactive Sulfide (mg/kg)	< 40	< 40	NA
<i>TPH Analysis, GC (8015/8100) (mg/kg)</i>			
Gasoline Range	0.37	10	0.38
Diesel Range	< 23	940	ND
<i>PCB Analysis, GC (8080)</i>	< MDL		NA
<i>RCRA TCLP VOC Analysis, GC/MS</i>	< MDL		NA
<i>RCRA TCLP SVOC Analysis, GC/MS</i>	< MDL		NA
<i>RCRA TCLP Pesticide Analysis, GC (mg/L)</i>			
Heptachlor	< 0.0001	0.0015	NA
<i>RCRA TCLP Herbicide Analysis, GC (mg/L)</i>			
2,4-D	< 0.0005	0.0038	NA
<i>RCRA TCLP Metals Analysis</i>	< MDL		NA

Note:

For discussion of Table 2-10, refer to Section 2.5.5 of CCR, Vol. 1.

ANALYTICAL SUMMARY TABLE 3-1

SITE 2/AREA F: FIREFIGHTER TRAINING AREA SOIL SAMPLING AND ANALYSIS NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND OHM PROJECT NO. 16006

<i>Sample No.:</i>	<i>F2A</i>	<i>F11B</i>	<i>F17A</i>	<i>F21A</i>	<i>F21B</i>	<i>F22A</i>	<i>F22B</i>
<i>Date:</i>	<i>07/15/94</i>	<i>07/15/94</i>	<i>07/25/94</i>	<i>07-15-94</i>	<i>07/15/94</i>	<i>07/12/94</i>	<i>07/12/94</i>
<i>Depth:</i>	<i>0-2'</i>	<i>2-4'</i>	<i>0-2'</i>	<i>0-2'</i>	<i>2-4'</i>	<i>0-2'</i>	<i>2-4'</i>
<i>Solids, Total %</i>	97.8	90.3	79.3	94.4	95.7	94.8	94.6
<i>TPH Analysis, IR (418.1M) (mg/kg)</i>	16.8	257	1,380	3.24 J	2.41 J	424	54.6

Notes:

For discussion of Tables 3-1 and 3-2, refer to Section 3.2.1 of CCR, Vol. 1.

Refer to Tables 3-14 and 3-17 for post-excavation confirmation data.

ANALYTICAL SUMMARY TABLE 3-2

SITE 2/AREA F: CONCRETE PAD AREA SOIL SAMPLING AND ANALYSIS NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND OHM PROJECT NO. 16006

<i>Sample No.: Date: Depth</i>	<i>F2A 07/15/94 0-2'</i>	<i>F11B 07/15/94 2-4'</i>	<i>F17A 07/25/94 0-2'</i>	<i>F21A 07/15/94 0-2'</i>	<i>F21B 07/15/94 2-4'</i>	<i>F22A 07/15/94 0-2'</i>	<i>F22B 07/12/94 2-4'</i>
Solids, Total %	97.8	90.3	79.3	94.4	95.7	94.8	94.6
TPH Analysis, IR (418.1) (mg/kg)	16.8	257	1,380	3.24 J	2.41 J	424	54.6
TPH Analysis, GC (8015/8100) (mg/kg)							
Light Hydrocarbons (C2 - C10)	<2.34	<2.27	<2.89	<2.34	<2.27	<2.32	11.9
Medium Hydrocarbons (C10 - C21)	0.054 J	33.7	395	<3.32	0.446 J	828	53.5
Heavy Hydrocarbons (C21 - C40)	3.480 J	105	786	0.190 J	<16.4	59.7	14.8 J
BTEX VOC Analysis, GC (8020) (mg/kg)							
Ethylbenzene	<0.001	<0.001	<0.001	<0.001	<0.001	0.005	0.073
Toluene	0.0007 J	<0.001	<0.001	<0.001	0.0006 J	0.0005 J	0.006
Xylenes	0.001 J	<0.001	<0.001	<0.001	0.0006 J	0.009	0.143

Note:

For discussion of Tables 3-1 and 3-2, refer to Section 3.2.1 of CCR, Vol. 1. Refer to Tables 3-14 and 3-17 for post-excavation confirmation data.

ANALYTICAL SUMMARY TABLE 3-3

SITE 2/AREA A: MONITORING WELL 2-GW-6 SOIL SAMPLING AND ANALYSIS NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND OHM PROJECT NO. 16006

<div>Sample No.: Date: Depth:</div>	A01A 08/02/94 0-2'	A01B 08/02/94 2-4'	A02A 08/02/94 0-2'	A02B 08/02/94 2-4'	A03A 08/02/94 0-2'	A03B 08/02/94 2-4'	A04A 08/02/94 0-2'	A04B 08/02/94 2-4'	A05A 08/02/94 0-2'	A05B 08/02/94 2-4'
Solids, Total %	81.9	81.9	80.5	80.0	83.5	82.9	77.8	80.0	80.0	80.8
TPH Analysis, GC (8015/8100) (mg/kg)										
Light Hydrocarbons (C2 - C10)	<MDL									
Medium Hydrocarbons (C10 - C21)	<MDL									
Heavy Hydrocarbons (C21 - C40)	<MDL									
Halogenated VOC Analysis, GC (8010) (mg/kg)										
Methylene chloride	NA	NA	0.002	0.002	NA	NA	NA	NA	0.005	0.006
BTEX VOC Analysis, GC (8020)	ND	ND	NA	NA	ND	ND	ND	ND	NA	NA
TCL Pesticide Analysis, GC (8080)	NA	NA	ND	ND	NA	NA	NA	NA	ND	ND
RCRA TCLP Metals Analysis (mg/L)										
Barum	NA	NA	1.00	1.03	NA	NA	NA	NA	0.662	0.649
Lead	NA	NA	0.808	0.004	NA	NA	NA	NA	0.002	0.003

Note:

For discussion of Tables 3-3 and 3-4, refer to Section 3.2.2 of CCR, Vol. 1.

ANALYTICAL SUMMARY TABLE 3-4

SITE 2/AREA B: MONITORING WELL 2-GW-8 SOIL SAMPLING AND ANALYSIS NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND OHM PROJECT NO. 16006

Sample No.: Date: Depth:	B01A 08/02/94 0-2'	B01B 08/02/94 2-4'	B02A 08/02/94 0-2'	B02B 08/02/94 2-4'	B03A 08/02/94 0-2'	B03B 08/02/94 2-4'	B04A 08/02/94 0-2'	B04B 08/02/94 2-4'	B05A 08/02/94 0-2'	B05B 08/02/94 2-4'
Solids, Total %	79.8	82.0	78.7	80.8	77.4	82.8	81.2	84.5	81.0	77.1
TPH Analysis, GC (8015) (mg/kg)										
Light Hydrocarbons (C2 - C10)	< MDL									
Medium Hydrocarbons (C10 - C21)	3.69 J	< 4.00	< 4.20	< 4.10	1.61 J	< 3.92	1.72 J	< 3.91	513	33.3
Heavy Hydrocarbons (C21 - C40)	14.4 J	0.972 J	1.850 J	2.71 J	5.22 J	2.21 J	11.1 J	2.74 J	373	16.4 J
Halogenated VOC Analysis, GC (8010) (mg/kg)										
Methylene chloride	0.011	0.009	NA	NA	NA	NA	0.025	0.001	NA	NA
BTEX VOC Analysis, GC (8020)	NA	NA	ND	ND	ND	ND	NA	NA	ND	ND
TCL Pesticide Analysis, GC (8080) (mg/kg)										
4,4'-DDE	< 0.021	< 0.020	NA	NA	NA	NA	0.026	< 0.020	NA	NA
4,4'-DDT	< 0.021	< 0.020	NA	NA	NA	NA	0.022	< 0.020	NA	NA
RCRA TCLP Metals Analysis (mg/L)										
Barium	0.548	0.874	NA	NA	NA	NA	1.04	1.06	NA	NA
Lead	0.01	< 0.002	NA	NA	NA	NA	0.011	0.009	NA	NA

Note:

For discussion of Tables 3-3 and 3-4, refer to Section 3.2.2 of CCR, Vol. 1.

ANALYTICAL SUMMARY TABLE 3-5

SITE 2/AREA F: FIREFIGHTER TRAINING BUILDING
"TAR" SAMPLING AND ANALYSIS
NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND
OHM PROJECT NO. 16006

<i>Sample No.:</i> <i>Date:</i>		BLDG-C-TAR 09/22/94
<i>Conventional Data (mg/kg)</i>		
Cyanide, Total		<0.500
<i>TAL Total Metals Analysis (mg/kg)</i>		
Aluminum		534
Antimony		<0.631
Arsenic		9.11
Barium		19.9
Beryllium		0.052
Cadmium		4.47
Calcium		1,620
Chromium		36.0
Cobalt		4.11
Copper		55.3
Iron		79,400
Lead		216
Magnesium		227
Manganese		216
Mercury		<0.048
Nickel		35.4
Potassium		96.6
Selenium		3.20
Silver		<0.123
Sodium		24.2
Thallium		10.4
Vanadium		28.4
Zinc		574

**TABLE 3-5
(CONTINUED)**

<i>Sample No.:</i> <i>Date:</i>		BLDG-C-TAR 09/22/94
<i>TCL Pesticide and PCB Analysis, GC (8080) (mg/kg)</i>		
4,4'-DDD		2.18
<i>TCL VOC Analysis, GC/MS (8240) (mg/kg)</i>		
Xylenes		1.18
<i>TCL SVOC Analysis, GC/MS (8270)</i>		< MDL

Note:

For discussion of Tables 3-5 and 3-6, refer to Section 3.2.4 of CCR, Vol. 1.

ANALYTICAL SUMMARY TABLE 3-6

**SITE 2/AREA F: FIREFIGHTER TRAINING BUILDING
LIQUID SAMPLING AND ANALYSIS
NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND
OHM PROJECT NO. 16006**

<div> <div>Sample No.:</div> <div>Date:</div> </div>		<div>BLDGH20</div> <div>10/03/94</div>
<i>Conventional Data (mg/kg)</i>		
Cyanide, Total		<0.010
<i>TAL Total Metals Analysis (mg/L)</i>		
Aluminum		0.440
Antimony		<0.030
Arsenic		<0.002
Barium		0.030
Beryllium		<0.0005
Cadmium		<0.001
Calcium		46.8
Chromium		<0.006
Cobalt		<0.004
Copper		0.018
Iron		6.24
Lead		0.059
Magnesium		4.24
Manganese		0.080
Mercury		0.0003
Nickel		<0.01
Potassium		8.15
Selenium		<0.001
Silver		<0.006
Sodium		5.85
Thallium		<0.015
Vanadium		0.006
Zinc		0.280

**TABLE 3-6
(CONTINUED)**

<i>Sample No.:</i> <i>Date:</i>	<i>BLDGH20</i> <i>10/03/94</i>
<i>TCL Pesticide and PCB Analysis, GC (8080)</i>	< MDL
<i>TCL VOC Analysis, GC/MS (8240)</i>	< MDL
<i>TCL SVOC Analysis, GC/MS (8270)</i>	< MDL

Note:

For discussion of Tables 3-5 and 3-6, refer to Section 3.2.4 of CCR, Vol. 1.

ANALYTICAL SUMMARY TABLE 3-7

SITE 2/AREA C: OIL SEPARATOR PIT INFLOW SWALE SOIL SAMPLING AND ANALYSIS NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND OHM PROJECT NO. 16006

<i>Sample No.: Date: Depth:</i>	<i>C1A 07/28/94 0-2'</i>	<i>C1B 07/28/94 2-4'</i>	<i>C2A 07/28/94 0-2'</i>	<i>C2B 07/28/94 2-4'</i>	<i>C3A 07/28/94 0-2'</i>	<i>C3B 07/28/94 2-4'</i>
Solids, Total %	80.6	82.2	80.3	78.7	75.8	79.2
TPH Analysis, GC (8015/8100) (mg/kg)						
Light Hydrocarbons (C2 - C10)	<MDL					
Medium Hydrocarbons (C10 - C21)	1.81 J	1.85 J	7.34	5.14	174	134
Heavy Hydrocarbons (C21 - C40)	12.40 J	10.00 J	33.4	21.5	503	273
Halogenated VOC Analysis, GC (8010) (mg/kg)						
Methylene Chloride	NA	NA	NA	NA	0.012 B	0.011 B
BTEX VOC Analysis, GC (8020) (mg/kg)						
<MDL						
TCL Pesticide Analysis, GC (8080) (mg/kg)	NA	NA	NA	NA	ND	ND
RCRA TCLP Metals Analysis (mg/L)						
Arsenic	NA	NA	NA	NA	0.016	<0.002
Barium	NA	NA	NA	NA	0.614	1.10
Lead	NA	NA	NA	NA	2.74	0.106

Note:

For discussion of Table 3-7, refer to Section 3.2.5 of CCR, Vol. 1.

ANALYTICAL SUMMARY TABLE 3-8

SITE 2/AREA D: OIL SEPARATOR PIT SOIL SAMPLING AND ANALYSIS NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND OHM PROJECT NO. 16006

<i>Sample No.:</i>	<i>D05A</i>	<i>D05B</i>	<i>D07A</i>	<i>D07B</i>	<i>D14A</i>	<i>D14B</i>	<i>D20A</i>	<i>D20B</i>
<i>Date:</i>	<i>08/04/94</i>	<i>08/04/94</i>	<i>08/04/94</i>	<i>08/04/94</i>	<i>08/04/94</i>	<i>08/04/94</i>	<i>08/04/94</i>	<i>08/04/94</i>
<i>Depth:</i>	<i>0-2'</i>	<i>2-4'</i>	<i>0-2'</i>	<i>2-4'</i>	<i>0-2'</i>	<i>2-4'</i>	<i>0-2'</i>	<i>2-4'</i>
Solids, Total %	72.6	78.6	63.7	38.4	72.6	78.5	43.1	77.8
Halogenated VOC Analysis, GC (8010) (mg/kg)								
Methylene Chloride	0.180 B	0.031 B	0.190 B	0.170 B	0.180 B	0.030 B	0.300 B	0.240 B
TPH Analysis, GC (8015/8100) (mg/kg)								
Light Hydrocarbons (C2 - C10)	29.6	<2.76	98.7	<5.64	14.2	<3.01	59.3	2.03 J
Medium Hydrocarbons (C10 - C21)	86,800	851	95,300	101	9,330	360	162,000	1,190
Heavy Hydrocarbons (C21 - C40)	37,400	235 J	12,300	1,080	2,540	71.6 J	39,800	397 J
BTEX VOC Analysis, GC (8020) (mg/kg)								
Ethylbenzene	<0.140	<0.006	0.310	<0.130	<0.140	<0.005	0.630	<0.064
Toluene	<0.140	<0.006	<0.160	<0.130	<0.140	<0.005	0.380	<0.064
Xylenes	0.310	0.006	3.60	<0.130	0.400	0.002 J	7.900	<0.063
TCL Pesticide Analysis, GC (8080) (mg/kg)	< MDL							
RCRA TCLP Metals Analysis (mg/L)								
Arsenic	0.010	0.011	0.013	0.015	<0.002	<0.002	<0.002	<0.002
Barium	0.855	1.090	0.556	0.774	1.080	1.30	0.520	2.360
Cadmium	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001
Lead	0.028	0.008	0.004	0.300	0.015	0.004	0.005	0.013

Note:

For discussion of Table 3-8, refer to Section 3.2.5 of CCR, Vol. 1.

ANALYTICAL SUMMARY TABLE 3-9

**SITE 2: OIL SEPARATOR PIT SEDIMENT SAMPLES
NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND
OHM PROJECT NO. 16006**

<i>Sample No.: Date: Depth:</i>	<i>CALIB1 10/11/94 0-1'</i>	<i>CALIB2 10/11/94 0-1'</i>
<i>Solids, Total %</i>	83.7	79.9
<i>TPH Analysis, IR (418.1M) (mg/kg)</i>		
Petroleum Hydrocarbons	1,800	10
<i>TPH Field Analyzer</i>	570	10

Notes:

CALIB1 and CALIB2 were collected to assess the correlation between on-site field screening instrument and off-site analytical results.

For discussion of Table 3-9, refer to Section 3.2.6 of CCR, Vol. 1.

ANALYTICAL SUMMARY TABLE 3-10

SITE 2: OIL SEPARATOR PIT SOIL SAMPLES NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND OHM PROJECT NO. 16006

<i>Sample No.:</i>	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
<i>Date:</i>	<i>10/25/94</i>	<i>10/25/94</i>	<i>10/25/94</i>	<i>10/25/94</i>
<i>Depth:</i>	<i>Sidewall</i>	<i>Sidewall</i>	<i>Sidewall</i>	<i>Sidewall</i>
<i>Solids, Total %</i>	83.6	88.5	87.8	88.7
<i>TPH Analysis, IR (418.1M) (mg/kg)</i>				
Petroleum Hydrocarbons	4,480	73.2	1,690	9,890
<i>TCL SVOC Analysis, GC/MS (8270)</i>	NA	NA	NA	ND

Notes:

Soil Samples A, B, C, and D were collected to assess berm soils located in the southwest corner of the separator pit.

For discussion of Table 3-10, refer to Section 3.2.7 of CCR, Vol. 1. Table 3-10 presents investigative data; refer to Table 3-24A for containment berm post-excavation data.

ANALYTICAL SUMMARY TABLE 3-11

SITE 2/AREA E: OIL SEPARATOR PIT OUTFLOW SWALE SOIL SAMPLING AND ANALYSIS
NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND
OHM PROJECT NO. 16006

<i>Sample No.:</i> <i>Date:</i> <i>Depth:</i>	<i>E01A</i> 07/29/94 0-2'	<i>E01B</i> 08/08/94 2-4'	<i>E02A</i> 07/29/94 0-2'	<i>E02B</i> 08/08/94 2-4'	<i>E03A</i> 07/29/94 0-2'	<i>E03B</i> 08/08/94 2-4'	<i>E04A</i> 07/29/94 0-2'	<i>E04B</i> 08/08/94 2-4'	<i>E05A</i> 07/29/94 0-2'	<i>E05B</i> 08/08/94 2-4'	<i>E06A</i> 07/29/94 0-2'
Solids, Total %	54.4	85.6	79.9	84.1	56.7	83.7	67.2	84.5	73.3	80.6	74.4
Halogenated VOC Analysis, GC (8010) (mg/kg)											
Methylene Chloride	NA	<0.120	NA	NA	0.013 B	NA	NA	0.017 B	NA	NA	0.005 B
TPH Analysis, GC (8015/8100) (mg/kg)											
Light Hydrocarbons (C2 - C10)	< MDL										
Medium Hydrocarbons (C10 - C21)	1,960	787	518	126	7,340	135	276	<3.89	48.4	<4.10	11.5
Heavy Hydrocarbons (C21 - C40)	1,110	335 J	248	25.2	6,650	104	427	5.21 J	77.8	<20.5	51.6
BTEX VOC Analysis, GC (8020) (mg/kg)											
Ethylbenzene	<0.002	<0.116	0.002	<0.001	<0.002	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001
Xylenes	0.001 J	<0.116	0.007	<0.001	<0.002	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001
TCL Pesticide Analysis, GC (8080) (mg/kg)											
4,4'-DDD	NA	<0.019	NA	NA	12.4	2.53	NA	<0.019	NA	NA	<0.022
4,4'-DDE	NA	<0.019	NA	NA	0.334	<0.019	NA	<0.019	NA	NA	0.014 J
4,4'-DDT	NA	<0.019	NA	NA	0.194	<0.019	NA	<0.019	NA	NA	0.020 J

**TABLE 3-11
(CONTINUED)**

	Sample No.:	E01A	E01B	E02A	E02B	E03A	E03B	E04A	E04B	E05A	E05B	E06A
	Date:	07/29/94	08/08/94	07/29/94	08/08/94	07/29/94	08/08/94	07/29/94	08/08/94	07/29/94	08/08/94	07/29/94
	Depth:	0-2'	2-4'	0-2'	2-4'	0-2'	2-4'	0-2'	2-4'	0-2'	2-4'	0-2'
	<i>als Analysis (mg/L)</i>											
RCRA TCLP Met		NA	1.84	NA	NA	1.11	NA	NA	0.506	NA	NA	0.957
Barium		NA	<0.001	NA	NA	<0.005	NA	NA	<0.001	NA	NA	0.002
Cadmium		NA	<0.006	NA	NA	<0.006	NA	NA	<0.006	NA	NA	0.015
Chromium		NA	0.011	NA	NA	0.085	NA	NA	0.004	NA	NA	0.024
Lead												

Note:

ble 3-11, refer to Section 3.2.8 of CCR, Vol. 1. Table 3-11 presents investigative data; refer to Table 3-22 for post-excavation confirmation data.

For discussion of Ta

ANALYTICAL SUMMARY TABLE 3-12

SITE 2/AREA D: OIL SEPARATOR PIT LIQUID SAMPLE
 NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND
 OHM PROJECT NO. 16006

Sample No.: Depth:	OWS-1 08/18/94
TAL Total Metals Analysis (mg/L)	
Aluminum	7.754
Antimony	<0.030
Arsenic	0.005
Barium	0.114
Beryllium	0.0005
Cadmium	0.002
Calcium	30.6
Chromium	0.014
Cobalt	0.007
Copper	0.043
Iron	14.800
Lead	0.128
Magnesium	5.150
Manganese	0.642
Mercury	0.0008
Nickel	0.010
Potassium	5.854
Selenium	0.002
Silver	<0.006
Sodium	3.638
Thallium	<0.015
Vanadium	0.030
Zinc	0.170

**TABLE 3-12
(CONTINUED)**

<i>Sample No.: Depth:</i>	<i>OWS-1 08/18/94</i>
<i>Conventional Data</i>	
Total Suspended Solids (mg/L)	760.0
Total Dissolved Solids (mg/L)	160.0
pH (Electrode) Std.	6.9
<i>TPH Analysis, GC (8015/8100) (mg/L)</i>	
Light Hydrocarbons (C2 - C10)	0.490
Medium Hydrocarbons (C10 - C21)	110
Heavy Hydrocarbons (C21 - C40)	22
<i>TCL Pesticide and PCB Analysis, GC (8080) (mg/L)</i>	
Aroclor 1248	0.003
<i>TCL VOC Analysis, MS (8240) (mg/L)</i>	
Toluene	0.007
Xylenes	0.007
<i>TCL SVOC Analysis, MS (8270) (mg/L)</i>	
2-Merhynaphthalene	0.120

Notes:

Liquid Sample OWS-1 was collected to assess potential "worst case" contamination in oil separator pit liquids. This data was used to design an appropriate temporary on-site water treatment system. The system handled liquids generated during dewatering of the oil separator pit.

For discussion of Table 3-12, refer to Section 3.2.6 of CCR, Vol. 1.

ANALYTICAL SUMMARY TABLE 3-13

SITE 2/AREA H: PESTICIDE-IMPACTED WETLAND AREA - SOIL SAMPLING AND ANALYSIS
NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND
OHM PROJECT NO. 16006

<i>Sample No.:</i>	<i>H01A</i>	<i>H01B</i>	<i>H02A</i>	<i>H02B</i>	<i>H03A</i>	<i>H03B</i>	<i>H04A</i>	<i>H05A</i>	<i>H05B</i>	<i>H06A</i>	<i>H06B</i>	<i>H07A</i>	<i>H07B</i>
<i>Date:</i>	07/20/94	08/02/94	07/20/94	08/02/94	07/20/94	08/02/94	07/20/94	07/20/94	08/02/94	07/20/94	08/03/94	07/20/94	08/03/94
<i>Depth:</i>	0-1'	1-2'	0-1'	1-2'	0-1'	1-2'	0-1'	0-1'	1-2'	0-1'	1-2'	0-1'	1-2'
<i>Solids, Total %</i>	69.4	75.1	60.5	80.1	42.6	81.4	40.0	39.5	84.5	29.7	74.5	34.8	53.5
<i>TCL Pesticide, GC (8080) (mg/kg)</i>													
4,4'-DDD	1.23	<0.022	10.2	<0.021	29.0	0.044	47.1	11.1	0.023	12.4	1.59	4.03	5.55
4,4'-DDE	1.94	<0.022	5.57	<0.021	2.38	<0.020	6.83	1.57	<0.019	1.29	0.239	0.677	3.24
4,4'-DDT	1.68	<0.022	23.0	<0.021	6.75	<0.020	13.7	1.13	0.017 J	1.42	0.218	1.69	0.958
Endosulfan I	0.060	<0.022	0.104	<0.021	0.357	<0.020	0.775	0.229	<0.019	0.163	0.024	0.087	<0.030

<i>Sample No.:</i>	<i>H08A</i>	<i>H09A</i>	<i>H10A</i>	<i>H11A</i>	<i>H12A</i>	<i>H13A</i>	<i>H14A</i>	<i>H15A</i>	<i>H16A</i>	<i>H17A</i>	<i>H18A</i>	<i>H18B</i>	<i>H19A</i>
<i>Date:</i>	07/20/94	07/20/94	07/20/94	07/20/94	07/20/94	07/20/94	07/20/94	07/20/94	07/20/94	07/20/94	07/20/94	08/03/94	07/20/94
<i>Depth:</i>	0-1'	0-1'	0-1'	0-1'	0-1'	0-1'	0-1'	0-1'	0-1'	0-1'	0-1'	1-2'	0-1'
<i>Solids, Total %</i>	54.6	39.6	72.5	79.9	82.9	68.0	73.4	74.4	58.1	57.0	54.5	60.1	30.2
<i>TCL Pesticide, GC (8080) (mg/kg)</i>													
4,4'-DDD	2.03	0.852	<0.023	<0.021	<0.020	<0.024	<0.022	<0.022	<0.028	0.277	20.1	2.92	24.7
4,4'-DDE	0.490	0.902	0.016 J	0.036	<0.020	<0.024	<0.022	<0.022	0.020 J	0.201	27.0	0.348	2.56
4,4'-DDT	0.232	0.350	<0.023	<0.021	<0.020	<0.024	<0.022	<0.022	<0.028	0.909	37.4	0.724	1.46
Endosulfan I	<0.030	<0.041	<0.023	<0.021	<0.020	<0.024	<0.022	<0.022	<0.028	<0.045	0.250	<0.027	0.350

TABLE 3-13
(CONTINUED)

Sample No.: Date: Depth:	H19B 08/03/94 1-2'	H20A 07/20/94 0-1'	H21A 07/20/94 0-1'	H21B 08/03/94 1-2'	H22A 07/20/94 0-1'	H22B 08/03/94 1-2'	H23A 07/20/94 0-1'	H24A 07/20/94 0-1'	H24B 08/03/94 1-2'	H25A 07/20/94 0-1'	H26A 07/20/94 0-1'	H27A 08/03/94 0-1'	H28A 08/03/94 0-1'
Solids, Total %	67.4	35.1	52.0	67.9	32.4	76.2	29.4	37.9	77.0	23.6	30.9	69.4	71.9
TCL Pesticide, GC (8080) (mg/kg)													
4,4'-DDD	0.249	1.73	7.35	1.98	1.11	0.100	0.410	0.048	<0.021	<0.021	0.029	1.45	0.061
4,4'-DDE	0.023 J	0.457	2.67	0.206	1.37	0.014 J	1.47	2.22	0.041	0.017 J	1.73	0.245	<0.023
4,4'-DDT	0.038	0.177	1.82	0.017 J	4.11	0.058	0.993	0.125	<0.021	<0.021	0.031	0.100	<0.023
Endosulfan I	<0.024	0.104	0.084	<0.024	0.047	<0.022	<0.023	<0.27	<0.021	<0.021	<0.023	0.078	<0.023

Sample No.: Date: Depth:	H29A 08/03/94 0-1'	H30A 08/03/94 0-1'	H31A 08/03/94 0-1'	H32A 08/03/94 0-1'	H33A 08/03/94 0-1'	H34A 08/03/94 0-1'	H35A 08/03/94 0-1'	H36A 08/03/94 0-1'	H37A 08/03/94 0-1'	H38A 08/03/94 0-1'	H39A 08/03/94 0-1'	H40A 08/03/94 0-1'	H41A 08/03/94 0-1'
Solids, Total %	70.6	69.7	78.5	73.9	78.6	77.4	65.0	67.7	67.6	65.8	79.1	80.8	71.3
TCL Pesticide, GC (8080) (mg/kg)													
4,4'-DDD	0.246	1.42	<0.021	2.24	0.054	0.029	0.146	3.50	0.120	0.120	<0.021	<0.020	<0.023
4,4'-DDE	0.743	0.335	<0.021	1.8	0.293	0.112	0.022 J	0.790	0.034	0.078	<0.021	<0.020	0.049
4,4'-DDT	0.058	0.097	<0.021	3.53	0.321	0.200	<0.026	0.751	0.025	0.912	<0.021	<0.020	<0.023
Endosulfan I	<0.023	<0.023	<0.021	<0.022	<0.021	<0.021	<0.026	<0.025	<0.024	<0.025	<0.021	<0.020	<0.023

**TABLE 3-13
(CONTINUED)**

<i>Sample No.:</i>	<i>H42A</i>	<i>H43A</i>	<i>H44A</i>	<i>H45A</i>	<i>H46A</i>	<i>H47A</i>	<i>H48A</i>	<i>H49A</i>
<i>Date:</i>	<i>08/02/94</i>	<i>08/02/94</i>	<i>09/20/94</i>	<i>09/20/94</i>	<i>09/20/94</i>	<i>09/20/94</i>	<i>09/20/94</i>	<i>09/20/94</i>
<i>Depth:</i>	<i>0-1'</i>	<i>0-1'</i>	<i>0-1'</i>	<i>0-1'</i>	<i>0-1'</i>	<i>0-1'</i>	<i>0-1'</i>	<i>0-1'</i>
<i>Solids, Total %</i>	66.9	79.9	75	59	54	24	44	86
<i>TCL Pesticide, GC (8080) (mg/kg)</i>								
4,4'-DDD	1.15	<0.021	<0.022	2.20	1.40	18.0	4.20	0.060
4,4'-DDE	1.83	0.046	<0.022	1.20	3.10	6.10	2.40	0.980
4,4'-DDT	0.303	0.031	<0.022	2.40	4.60	0.380	2.50	0.120
Endosulfan I	0.061	<0.021	<0.022	<0.028	<0.030	<0.069	<0.037	<0.019

Note:

For discussion of Table 3-13, refer to Section 3.2.11 of CCR, Vol. 1. Table 3-13 presents investigative data; refer to Table 3-27 for post-excavation confirmation data.

ANALYTICAL SUMMARY TABLE 3-14

**SITE 2/AREA F: FIREFIGHTER TRAINING AREA SOIL CONFIRMATION SAMPLING
NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND
OHM PROJECT NO. 16006**

<i>Sample No.:</i>	<i>F-17-1</i>	<i>F-17-2</i>	<i>F-17-3</i>	<i>F-22-1</i>	<i>F-22-2</i>	<i>F-22-3</i>	<i>F-22-4</i>
<i>Date:</i>	<i>09/22/94</i>	<i>09/22/94</i>	<i>09/22/94</i>	<i>09/22/94</i>	<i>09/22/94</i>	<i>09/22/94</i>	<i>09/22/94</i>
<i>Depth:</i>	<i>2'</i>	<i>2'</i>	<i>2'</i>	<i>2'</i>	<i>2'</i>	<i>2'</i>	<i>2'</i>
<i>Solids, Total %</i>	83	82	85	84	87	84	85
<i>TPH Analysis, IR (418.1M) (mg/kg)</i>							
Petroleum Hydrocarbons	7.0 J	700	21	12	1.6 J	3.0 J	6.8 J

Note:

The area where samples F-17-1 through F-17-3 were collected was subsequently excavated to greater depth; the results of post-excavation confirmation sampling are provided in Table 3-17. For discussion of Table 3-14, refer to Section 3.3.1 of CCR, Vol. 1.

ANALYTICAL SUMMARY TABLE 3-15

FIREFIGHTER TRAINING AREA CONFIRMATION SOIL SAMPLING AND ANALYSIS FORMER LOCATION OF UST NOS. 1 AND 2 NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND OHM PROJECT NO. 16006

<i>Sample No. Date:</i>	<i>T1-1W 01/19/95</i>	<i>T1-2W 01/19/95</i>	<i>T1-3W 01/19/95</i>	<i>T1-4W 01/19/95</i>	<i>T1-5W 01/19/95</i>	<i>T1-6W 01/19/95</i>	<i>T1-7W 01/19/95</i>	<i>T1-8W 01/19/95</i>	<i>T1-9W 01/19/95</i>	<i>T1-10W 01/19/95</i>	<i>T1-11W 01/19/95</i>
<i>Solids, Total %</i>	81.2	84.8	82.1	80.9	80.8	83.5	81.5	85.4	86.7	76.8	87.3
<i>TPH Analysis, IR (418.1M) (mg/kg)</i>	< 19	< 17	< 19	31	< 19	< 18	< 19	< 18	< 18	< 20	< 18
<i>BTEX VOC Analysis, GC (8020) (mg/kg)</i>											
<i>Benzene</i>	NA	NA	<0.0012	NA	<0.0012	NA	NA	0.0018	NA	NA	NA
<i>Toluene</i>	NA	NA	<0.0012	NA	<0.0012	NA	NA	<0.0012	NA	NA	NA
<i>Ethylbenzene</i>	NA	NA	0.0024	NA	0.0012	NA	NA	<0.0012	NA	NA	NA
<i>Xylenes</i>	NA	NA	0.0039	NA	<0.0036	NA	NA	<0.0035	NA	NA	NA

Notes:

All samples were collected from the excavation sidewalls between 0 - 4' above the water table, and biased toward any staining or exposed piping.

For discussion of Table 3-15, refer to Section 3.3.2 of CCR, Vol. 1.

ANALYTICAL SUMMARY TABLE 3-16A

FIREFIGHTER TRAINING AREA SOIL SAMPLING AND ANALYSIS FORMER LOCATION OF UST NOS. 3 AND 4 NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND

<i>Sample No.:</i> <i>Date:</i> <i>Depth:</i>		UST3 10/07/94 7-15'
Solids, Total %		78
TPH Analysis, IR (418.1M) (mg/kg)		
Petroleum Hydrocarbons		1,600
Halogenated VOC Analysis, GC (8010) (mg/kg)		<MDL
BTEX VOC Analysis, GC (8020) (mg/kg)		
Ethylbenzene		0.230
Xylenes		1.50
TCL SVOC Analysis, GC/MS (8270) (mg/kg)		
2-Methylnaphthalene		13

Note:

For discussion of Table 3-16A, refer to Section 3.3.2 of CCR, Vol. 1.

ANALYTICAL SUMMARY TABLE 3-16B

FIREFIGHTER TRAINING AREA SOIL SAMPLING AND ANALYSIS FORMER LOCATION OF UST NOS. 3 AND 4 NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND OHM PROJECT NO. 16006

<i>Sample No.:</i>	<i>T3WEST</i>	<i>T3EAST</i>	<i>T3BOT</i>	<i>T3BOT</i>	<i>T3SOUTH</i>	<i>UST3NORTH</i>
<i>Date:</i>	<i>10/18/94</i>	<i>10/18/94</i>	<i>10/08/94</i>	<i>10/27/94</i>	<i>10/18/94</i>	<i>10/18/94</i>
<i>Depth:</i>	<i>7-15'</i>	<i>7-15'</i>	<i>18'</i>	<i>18'</i>	<i>7-15'</i>	<i>7-15'</i>
<i>Solids, Total %</i>	80	88	75	73	87	88
<i>TPH Analysis, IR (418.1M) (mg/kg)</i>						
Petroleum Hydrocarbons	33	5.3 J	NA	12	19	19
<i>BTEX VOC Analysis, GC (8020)</i>	ND	ND	NA	NA	ND	ND
<i>TCL VOC Analysis, GC/MS (8240) (mg/kg)</i>						
Acetone	NA	NA	0.043 B	NA	NA	NA
Methylene Chloride	NA	NA	0.01 B	NA	NA	NA
Toluene	NA	NA	0.027 B	NA	NA	NA
Xylenes	NA	NA	0.02 B	NA	NA	NA

Note:

For discussion of Table 3-16B, refer to Section 3.3.2 of CCR, Vol. 1.

ANALYTICAL SUMMARY TABLE 3-16C

FIREFIGHTER TRAINING AREA LIQUID SAMPLING AND ANALYSIS
FORMER LOCATION OF UST NOS. 3 AND 4
NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND
OHM PROJECT NO. 16006

<i>Sample No.:</i>	<i>T3H20</i>
<i>Date:</i>	<i>10/27/94</i>
<i>Depth:</i>	<i>14'</i>
<i>TPH Analysis, IR (418.1) (mg/L)</i>	
Petroleum Hydrocarbons	0.150 B

Note:

T3H20 is a groundwater sample collected from bottom of excavation at former location of UST Nos. 3 and 4.

For discussion of Table 3-16C, refer to Section 3.3.2 of CCR, Vol. 1.

ANALYTICAL SUMMARY TABLE 3-17

FIREFIGHTER TRAINING AREA SOIL SAMPLING AND ANALYSIS FORMER LOCATION OF UST NOS. 5 AND 6 NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND OHM PROJECT NO. 16006

<i>Sample No.: Date: Depth:</i>	<i>T5WEST 11/08/94 6-10'</i>	<i>T5EAST 11/08/94 0-6'</i>	<i>T5EAST 11/19/94 5-12'</i>	<i>T5SOUTH 11/08/94 2-10'</i>	<i>T5SOUTH 11/19/94 4-11'</i>	<i>T5NORTH 11/19/94 6-10'</i>	<i>T5BOT 11/19/94 13'</i>
<i>Solids, Total %</i>	91	91	80.4	84	87.9	82.3	85.5
<i>TPH Analysis, IR (418.1M) (mg/kg)</i>							
Petroleum Hydrocarbons	5.5 J	180	< 19	110	< 18	< 19	< 18
<i>Halogenated VOC Analysis, GC (8010) (mg/kg)</i>							
Methylene Chloride	NA	0.006	NA	0.005	NA	NA	NA
<i>BTEX VOC Analysis, GC (8020)</i>	NA	ND	NA	ND	NA	NA	NA

Note:

For discussion of Table 3-17, refer to Section 3.3.2 of CCR, Vol. 1.

ANALYTICAL SUMMARY TABLE 3-18

FIREFIGHTER TRAINING AREA SOIL SAMPLING AND ANALYSIS FORMER LOCATION OF AST NO. 7 NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND OHM PROJECT NO. 16006

<i>Sample No.:</i> <i>Date:</i> <i>Depth:</i>		T7BOT 11/08/94 3'
Solids, Total %		92
TPH Analysis, IR (418.1M) (mg/kg)		
Petroleum Hydrocarbons		74
Halogenated VOC Analysis, GC (8010) (mg/kg)		
Methylene Chloride		0.006
BTEX, VOC Analysis, GC (8020)		ND

Note:

For discussion of Table 3-18, refer to Section 3.3.2 of CCR, Vol. 1.

ANALYTICAL SUMMARY TABLE 3-19

**FIREFIGHTER TRAINING AREA SOIL SAMPLING AND ANALYSIS
FORMER LOCATION OF UST NOS. 8 AND 9
NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND
OHM PROJECT NO. 16006**

<i>Sample No.:</i>	<i>T9WEST</i>	<i>T9EAST</i>	<i>T9NORTH</i>	<i>T9BOT</i>	<i>T9SOUTH</i>
<i>Date:</i>	<i>10/26/94</i>	<i>10/27/94</i>	<i>10/27/94</i>	<i>10/26/94</i>	<i>10/26/94</i>
<i>Depth:</i>	<i>4-8'</i>	<i>4'</i>	<i>5'</i>	<i>10'</i>	<i>3-7'</i>
<i>Solids, Total %</i>	91	85	90	85	89
<i>TPH Analysis, IR (418.1M) (mg/kg)</i>					
Petroleum Hydrocarbons	2.0 B, J	12 B	9.6 B	110.0	25.0 B

Note:

For discussion of Table 3-19, refer to Section 3.3.2 of CCR, Vol. 1.

ANALYTICAL SUMMARY TABLE 3-20

FIREFIGHTER TRAINING AREA SOIL SAMPLING AND ANALYSIS FORMER LOCATION OF UST NO. 10 NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND OHM PROJECT NO. 16006

<i>Sample No.:</i>	<i>T10WEST</i>	<i>T10EAST</i>	<i>T10NORTH</i>	<i>T10SOUTH</i>	<i>T10BOT</i>
<i>Date:</i>	<i>10/21/94</i>	<i>10/21/94</i>	<i>10/21/94</i>	<i>10/21/94</i>	<i>10/21/94</i>
<i>Depth:</i>	<i>2-7'</i>	<i>2-7'</i>	<i>2-7'</i>	<i>2-7'</i>	<i>9'</i>
<i>Solids, Total %</i>	83	84	83	82	82
<i>TPH Analysis, IR (418.1M) (mg/kg)</i>					
Petroleum Hydrocarbons	7.4 B, J	0.36 B, J	2.60 B, J	0.37 B, J	16.0 B

Note:

For discussion of Table 3-20, refer to Section 3.3.2 of CCR, Vol. 1.

ANALYTICAL SUMMARY TABLE 3-21

FIREFIGHTER TRAINING AREA SOIL SAMPLING AND ANALYSIS FORMER LOCATION OF ADMINISTRATION BUILDING UST NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND OHM PROJECT NO. 16006

<i>Sample No.: Date: Depth:</i>	<i>ABTWEST 10/19/94 0-15'</i>	<i>ABTEAST 10/18/94 0-15'</i>	<i>ABTSOUTH 10/18/94 0-15'</i>	<i>ABTNORTH 10/18/94 0-15'</i>	<i>ABTBOT 10/19/94 15'</i>
<i>Solids, Total %</i>	88	91	85	83	94
<i>TPH Analysis, IR (418.1M) (mg/kg)</i>					
Petroleum Hydrocarbons	2.40 J	<7.30	21.0	9.60	1.90 J
<i>BTEX VOC Analysis, GC (8020)</i>	ND	NA	NA	NA	ND

Note:

For discussion of Table 3-21, refer to Section 3.3.2 of CCR, Vol. 1.

ANALYTICAL SUMMARY TABLE 3-22

SITE 2/AREA E: OIL SEPARATOR PIT OUTFLOW SWALE CONFIRMATION SOIL SAMPLING AND ANALYSIS
NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND
OHM PROJECT NO. 16006

<i>Sample No.: Date: Depth:</i>	<i>E07C 10/05/94 3'</i>	<i>E08C 10/05/94 3'</i>	<i>E09C 10/05/94 3'</i>	<i>E09C2 10/17/94 1' Below E09C</i>	<i>E10C 10/05/94 3'</i>	<i>E10C2 10/17/94 1' Below E10C</i>	<i>E11C 10/05/94 3'</i>	<i>E11C2 10/17/94 1' Below E11C</i>	<i>E12C 10/05/94 3'</i>	<i>E12C2 10/13/94 1' Below E12C</i>	<i>E13C 11/03/94 Berm</i>	<i>E14C 11/03/94 Berm</i>	<i>E15C 11/03/94 Berm</i>
Solids, Total %	92	89	83	90	79	85	83	88	76	86	92	87	89
TPH Analysis, IR (418.1M) (mg/kg)													
Petroleum Hydrocarbons	1.1 B, J	30 B	76 B	6.4 J	900 B	32	63	5.7 J	100 B	7.9	16	1.7 J	28
TCL Pesticide Analysis, GC (8080) (mg/kg)													
4,4'-DDD	<0.018	0.083	16.0	0.270	0.960	NA	0.470	0.040	0.820	NA	NA	NA	NA
4,4'-DDE	<0.018	<0.019	0.540	0.010 J	0.460	NA	0.500	0.010 J	0.130	NA	NA	NA	NA
4,4'-DDT	<0.018	<0.019	7.6	0.102	0.880	NA	1.60	0.024	0.230	NA	NA	NA	NA

Note:

For discussion of Table 3-22, refer to Section 3.3.3 of CCR, Vol. 1. Refer to Table 3-12 for investigative data.

ANALYTICAL SUMMARY TABLE 3-23A

OIL SEPARATOR PIT CONFIRMATION SOIL SAMPLING AND ANALYSIS NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND OHM PROJECT NO. 16006

<i>Sample No.:</i>	<i>D25C</i>	<i>D26C</i>	<i>D27C</i>	<i>D28C</i>	<i>D29C</i>	<i>D30C</i>	<i>D31C</i>	<i>D32C</i>	<i>D33C</i>
<i>Date:</i>	<i>10/17/94</i>	<i>10/18/94</i>	<i>10/20/94</i>	<i>10/18/94</i>	<i>10/20/94</i>	<i>10/19/94</i>	<i>10/18/94</i>	<i>10/19/94</i>	<i>10/20/94</i>
<i>Depth:</i>	<i>0-1'</i>	<i>0-1'</i>	<i>0-1'</i>	<i>0-1'</i>	<i>0-1'</i>	<i>0-1'</i>	<i>0-1'</i>	<i>0-1'</i>	<i>0-1'</i>
<i>Solids, Total %</i>	78	86	87	89	88	86	87	91	88
<i>TPH Analysis, IR (418.1M) (mg/kg)</i>									
Petroleum Hydrocarbons	3.2	29	<7.5	3.1 J	2.4 J	27	52	15	7.8

<i>Sample No.:</i>	<i>D34C</i>	<i>D35C</i>	<i>D36C</i>	<i>D37C</i>	<i>D38C</i>	<i>D39C</i>	<i>D40C</i>	<i>D41C</i>
<i>Date:</i>	<i>10/19/94</i>	<i>10/18/94</i>	<i>10/18/94</i>	<i>10/20/94</i>	<i>10/20/94</i>	<i>10/20/94</i>	<i>10/20/94</i>	<i>10/21/94</i>
<i>Depth:</i>	<i>0-1'</i>	<i>0-1'</i>	<i>0-1'</i>	<i>0-1'</i>	<i>0-1'</i>	<i>0-1'</i>	<i>0-1'</i>	<i>0-1'</i>
<i>Solids, Total %</i>	89	87	78	80	82	99.9	84	84
<i>TPH Analysis, IR (418.1M) (mg/kg)</i>								
Petroleum Hydrocarbons	3.6 J	90	45	<8.1	71	7.8	2.9 J	<7.7

<i>Sample No.:</i>	<i>D42C</i>	<i>D43C</i>	<i>D44C</i>	<i>D45C</i>	<i>D46C</i>	<i>D47C</i>	<i>D48C</i>	<i>D49C</i>
<i>Date:</i>	<i>10/21/94</i>	<i>10/22/94</i>	<i>10/21/94</i>	<i>11/09/94</i>	<i>11/09/94</i>	<i>11/15/94</i>	<i>11/14/94</i>	<i>11/14/94</i>
<i>Depth:</i>	<i>0-1'</i>	<i>0-1'</i>	<i>0-1'</i>	<i>0-1'</i>	<i>0-1'</i>	<i>0-1'</i>	<i>0-1'</i>	<i>0-1'</i>
<i>Solids, Total %</i>	88	73	82	83	76	85	84	85
<i>TPH Analysis, IR (418.1M) (mg/kg)</i>								
Petroleum Hydrocarbons	82	74	3.5 J	7.2 B, J	10 B	4.6 B, J	54 B	40 B

Note:

For discussion of Tables 3-23A and 3-23B, refer to Section 3.3.4 of CCR, Vol. 1. Refer to Table 3-8 for investigative data.

ANALYTICAL SUMMARY TABLE 3-23B

OIL SEPARATOR PIT CONFIRMATION SOIL SAMPLING AND ANALYSIS NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND OHM PROJECT NO. 16006

<i>Sample No.:</i>	<i>D29C</i>	<i>D33C</i>	<i>D46C</i>	<i>D47C</i>
<i>Date:</i>	<i>11/18/94</i>	<i>11/18/94</i>	<i>11/09/94</i>	<i>11/15/94</i>
<i>Depth:</i>	<i>0-1'</i>	<i>0-1'</i>	<i>0-1'</i>	<i>0-1'</i>
<i>VOC Analysis, GC (8021) (mg/kg)</i>				
Methylene Chloride	0.003 B	0.005 B	0.003	0.004 B
Naphthalene	0.0006 J	0.0008 J	<0.001	0.002
Tetrachloroethylene	0.0003 B, J	0.001 B	0.0001 B, J	<0.001
<i>TCL Pesticide and PCB Analysis, GC (8080)</i>	<MDL			
<i>VOC Analysis, GC/MS (8240) (mg/kg)</i>				
Acetone	0.01 B	0.006 B, J	NA	NA
Methylene Chloride	0.008 B	0.005 B	NA	NA

Note:

For discussion of Tables 3-23A and 3-23B, refer to Section 3.3.4 of CCR, Vol. 1. Refer to Table 3-8 for investigative data.

ANALYTICAL SUMMARY TABLE 3-24A

OIL SEPARATOR BERM CONFIRMATION SOIL SAMPLING AND ANALYSIS
 NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND
 OHM PROJECT NO. 16006

Sample No.: Date:	BERM2 11/02/94	BERM5 11/03/94	BERM 10 11/81/94	BERM 11 11/18/94	BERM12 11/18/94	BERM13 11/18/94	BERM14 11/18/94	BERM15 11/18/94	BERM15C 12/03/94	BERM16 11/18/94	BERM16C 12/04/94
Solids, Total %	85	80	72	84	76	78	83	82	83.4	78	78.3
TPH Analysis, IR (418.1M) (mg/kg)											
Petroleum Hydrocarbons	10	210	3.9 B, J	5.5 B, J	47 B	79 B	3.4 B, J	30 B	< 18	100 B	25

Sample No.: Date:	BERM17 11/18/94	BERM18 11/18/94	BERM 19 11/18/94	BERM 20 11/18/94	BERM21 11/18/94	BERM21C 12/03/94	BERM22 11/18/94	BERM23 11/18/94	BERM24 11/18/94	BERM25 11/18/94	BERM25 11/18/94
Solids, Total %	80	78	74	81	79	83.2	79	80	73	81	74
TPH Analysis, IR (418.1M) (mg/kg)											
Petroleum Hydrocarbons	18 B	12 B	7.1 B, J	7.8 B, J	140 B	18	5.8 B, J	7.5 B, J	7.8 B, J	5.6 B, J	3.3 B, J

Sample No.: Date:	BERM 27 11/21/94	BERM28 11/21/94	BERM 28C 12/4/94	BERM 29 11/21/94	BERM30 11/21/94	BERM31 11/21/94	BERM32 11/21/94	BERM33 11/21/94	BERM34 11/21/94	BERM35 11/21/94	BERM35C 12/04/94
Solids, Total %	88.5	90.0	82.0	84.3	87.6	87.7	88.4	91.9	89.5	73.5	93.2
TPH Analysis, IR (418.1M) (mg/kg)											
Petroleum Hydrocarbons	45	260	< 18	< 18	57	< 18	< 17	< 16	< 17	110	17

**TABLE 3-24A
(CONTINUED)**

<i>Sample No.: Date:</i>	<i>BERM36 11/21/94</i>	<i>BERM37 11/21/94</i>	<i>BERM37C 12/4/94</i>	<i>BERM38 11/21/94</i>	<i>BERM38C 12/03/94</i>	<i>BERM39 11/21/94</i>	<i>BERM39C 1/03/94</i>	<i>BERM40 11/21/94</i>	<i>BERM40C 12/04/94</i>	<i>BERM41 11/21/94</i>
<i>Solids, Total %</i>	89.1	92.4	94.8	96.6	89.7	90.3	86.3	76.3	88.7	86.6
<i>TPH Analysis, IR (418.1M) (mg/kg)</i>							86.3	76.3	88.7	86.6
<i>Petroleum Hydrocarbons</i>	43	1,300	< 16	1,600	< 17	840				
<i>Note:</i>							< 18	280	< 17	< 17

For discussion of Tables 3-24A and 3-24B, refer to Section 3.3.5 of CCR, Vol. 1.

ANALYTICAL SUMMARY TABLE 3-24B

OIL SEPARATOR BERM CONFIRMATION SOIL SAMPLING AND ANALYSIS NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND OHM PROJECT NO. 16006

<i>Sample No.: Date:</i>	<i>BERM36 11/21/94</i>	<i>BERM41 11/21/94</i>
<i>Solids, Total %</i>	89.1	86.6
<i>TPH Analysis, IR (418.1M) (mg/kg)</i>		
Petroleum Hydrocarbons	43	< 17
<i>Halogenated VOC Analysis, GC (8010) (mg/kg)</i>		
Methylene Chloride	0.007 B	0.0086 B
<i>BTEX VOC Analysis, GC (8020)</i>	<MDL	
<i>TCL Pesticide Analysis, GC (8080) (mg/kg)</i>		
4,4'-DDD	<0.0037	0.012
4,4'-DDE	<0.0037	0.0093
4,4'-DDT	<0.0037	0.160

Note:

For discussion of Tables 3-24A and 3-24B, refer to Section 3.3.5 of CCR, Vol. 1.

ANALYTICAL SUMMARY TABLE 3-25

SITE 2: SEPARATOR PIT GROUNDWATER SAMPLING AND ANALYSIS
NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND

OHM PROJECT NO. 16006

<i>Location:</i> <i>Date:</i>		<i>PIT H2O NW</i> <i>10/27/94</i>	<i>PIT H2O SW</i> <i>10/27/94</i>
<i>TAL Total Metals Analysis (mg/L)</i>			
Aluminum		2.99	0.604
Antimony		0.030	<0.030
Arsenic		<0.002	<0.002
Barium		0.032	0.054
Beryllium		0.0016	0.0016
Cadmium		<0.0011	<0.0011
Calcium		13.4	24.5
Chromium		<0.0059	<0.0059
Cobalt		<0.0037	<0.0037
Copper		0.0084	<0.0055
Iron		2.75	17.1
Lead		<0.0011	<0.0011
Magnesium		6.5	7.57
Manganese		0.055	8.47
Mercury		<0.00014	<0.00014
Nickel		<0.01	<0.0095
Potassium		1.49	1.65
Selenium		<0.0011	<0.0011
Silver		<0.006	0.0077
Sodium		7.62	12.3
Thallium		<0.002	<0.002
Vanadium		<0.0042	<0.0042
Zinc		0.008	<0.0041

**TABLE 3-25
(CONTINUED)**

<i>Location:</i>		<i>PIT H2O NW</i>	<i>PIT H2O SW</i>
<i>Date:</i>		<i>10/27/94</i>	<i>10/27/94</i>
<i>TPH Analysis, IR (418.1) (mg/L)</i>			
Petroleum Hydrocarbons		<0.100	2.3 B
<i>TCL Pesticide and PCB Analysis, GC (8080) (mg/L)</i>			
4,4' DDT		<0.00011	0.0014
<i>TCL VOC Analysis, GC/MS (8240)</i>		<MDL	
<i>TCL SVOC Analysis, GC/MS (8270)</i>		<MDL	

Note:

For discussion of Table 3-25, refer to Section 3.3.6 of CCR, Vol. 1.

ANALYTICAL SUMMARY TABLE 3-26

FIRE TRAINING AREA CONFIRMATION SOIL SAMPLING AND ANALYSIS
 CONCRETE SEPARATOR VAULT SOIL REMOVAL
 NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND
 OHM PROJECT NO. 16006

<i>Sample No.:</i>	<i>SV01W</i>	<i>SV02W</i>	<i>SV03W</i>	<i>SV04FL</i>	<i>SV05W</i>	<i>SV06W</i>	<i>SV07W</i>	<i>SV08W</i>	<i>SV09W</i>	<i>SV10W</i>	<i>SV11W</i>	<i>SV12W</i>
<i>Date:</i>	<i>01/11/95</i>	<i>01/11/95</i>	<i>01/11/95</i>	<i>01/11/95</i>	<i>01/11/95</i>	<i>01/11/95</i>	<i>01/11/95</i>	<i>01/11/95</i>	<i>01/11/95</i>	<i>01/11/95</i>	<i>01/11/95</i>	<i>01/11/95</i>
<i>Depth:</i>	<i>6-10' bgs</i>	<i>6-10' bgs</i>	<i>6-10' bgs</i>	<i>8' bgs</i>	<i>6-10' bgs</i>	<i>6-10' bgs</i>	<i>6-10' bgs</i>	<i>6-10' bgs</i>	<i>6-10' bgs</i>	<i>6-10' bgs</i>	<i>6-10' bgs</i>	<i>6-10' bgs</i>
<i>Solids, Total %</i>	90	89	88	79	89.1	74.2	87.6	86.8	83.4	87.6	82.6	81.4
<i>TPH Analysis, IR (418.1M) (mg/kg)</i>	4.5 B, J	4.1 B, J	5.2 B, J	3,100 B	42	38	<17	<17	26	390	<18	<19
<i>BTEX VOC Analysis, GC (8020) (mg/kg)</i>												
Berzene	NA	NA	NA	NA	<0.001	NA	NA	NA	0.0016	NA	<0.0012	NA
Toluene	NA	NA	NA	NA	<0.001	NA	NA	NA	0.0036	NA	<0.0012	NA
Ethylbenzene	NA	NA	NA	NA	<0.001	NA	NA	NA	<0.0012	NA	0.0016	NA
Xylenes	NA	NA	NA	NA	<0.003	NA	NA	NA	0.0035	NA	<0.0036	NA

Note:

For discussion of Table 3-26, refer to Section 3.3.7 of CCR, Vol. 1.

ANALYTICAL SUMMARY TABLE 3-27

**SITE 2/AREA H: PESTICIDE-IMPACTED WETLAND AREA
CONFIRMATION SOIL SAMPLING AND ANALYSIS
NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND
OHM PROJECT NO. 16006**

Sample No.: Date: Depth:	H50C 12/12/94 2'	H51C 12/12/94 2'	H52C 12/12/94 2'	H53C 12/12/94 2'	H54C 12/12/94 2'	H54C2 01/25/95 4'	H55C 12/12/94 2'	H56C 12/12/94 2'	H56C2 01/25/95 4'	H57C 12/12/94 2'	H58C 12/12/94 2'	H59C 12/12/94 2'	H60C 12/12/94 2'
Solids, Total %	67.0	75	74	68	71	84.2	77	71	85.2	66	77	81	68
TCL Pesticide Analysis, GC (8080) (mg/kg)													
4,4'-DDD	0.045	0.83	<0.022	0.021 J	7.3	<0.039	2.1	4.5	<0.038	0.062	1.9	0.79	1.2
4,4'-DDE	0.27	0.43	<0.022	<0.024	0.8	<0.039	0.29	0.86	<0.039	0.051	0.14	0.13	0.20
4,4'-DDT	0.073	1.4	0.04	<0.024	3.1	<0.039	0.78	0.28	<0.038	0.36	0.039	0.004 J	1.4
Ersosulfan I	<0.0049	<0.022	<0.022	<0.024	<0.047	<0.019	<0.021	<0.023	<0.019	<0.025	<0.021	<0.020	<0.024

Sample No.: Date: Depth:	H61C 01/06/95 2'	H61C2 01/25/95 4'	H62C 01/06/95 2'	H63C 01/06/95 2'	H64C 01/06/95 2'	H65C 01/06/95 2'	H65C2 01/25/95 4'	H66C 01/06/95 2'	H66C2 01/25/95 4'	H67C 01/06/95 2'	H67C2 01/25/95 4'	H68C 01/06/95 2'	H68C2 01/06/95 4'
Solids, Total %	75	67.5	81	78	68	79	83.9	72	86.0	81	77.9	66	85.1
TCL Pesticide Analysis, GC (8080) (mg/kg)													
4,4'-DDD	4.4	0.290	0.051	2.0	0.13	6.0	0.014	8.3	<0.0038	1.3	<0.021	2.6	<0.0039
4,4'-DDE	0.160	0.088	0.069	0.37	0.42	1.9	0.0045	1.2	<0.0038	0.86	0.028	1.5	<0.0039
4,4'-DDT	1.3	0.140	0.049	1.7	0.34	18.0	0.045	3.9	<0.0038	2.3	0.110	4.0	<0.0039
Ersosulfan I	<0.022	<0.024	<0.020	<0.021	<0.024	<0.210	<0.0019	<0.046	<0.0019	<0.021	<0.010	<0.025	<0.0019

Note:

For discussion of Table 3-27, refer to Section 3.3.3 of CCR, Vol. 1. Refer to Table 3-13 for investigative data.

TABLE 3-28A

QUALITY ASSURANCE DUPLICATE ANALYSIS
FIREFIGHTER TRAINING PAD AND SEPARATOR PIT AREA
NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND
OHM PROJECT NO. 16006

Sample No.: Date:	F-21A 07/15/94	DUP001 07/15/94	RPD %	E-1A 08/02/94	DUP004 08/02/94	RPD %	B-04B 08/02/94	DUP005 08/02/94	RPD %	D-5B 08/02/94	DUP-008 08/02/94	RPD %	DJ3C 11/18/94	DUP010 11/18/94	RPD %
TPH, IR (418.1M) (mg/kg)	3,240 J	4,770 J	38.2	<MDL	<MDL	NS	<MDL	<MDL	NS	<MDL	<MDL	NS	NA	NA	NS
TPH Analysis, GC (8015/8100) (mg/kg)															
Light Hydrocarbons (C2 - C10)	<MDL	<MDL	NS	<MDL	<MDL	NS	<MDL	<MDL	NS	<MDL	<MDL	NS	NA	NA	NS
Medium Hydrocarbons (C10 - C21)	<3.320	0.121 J	NS	276	364	27.3	<3.910	1.080 J	NS	851	115.0	150	NA	NA	NS
Heavy Hydrocarbons (C21 - C40)	0.190 J	2.440 J	NS	427	613	35.8	2.740 J	7.880 J	95.8	23.50	44.60	62	NA	NA	NS
BTEX VOC Analysis, GC (8020) (mg/kg)															
Benzene	<MDL	<MDL	NS	<MDL	<MDL	NS	<MDL	<MDL	NS	<MDL	<MDL	NS	0.002	0.0001 J	181
Toluene	<0.001	0.00057	140	<MDL	<MDL	NS	<MDL	<MDL	NS	<MDL	<MDL	NS	0.0002 B,J	0.0002 B	0.00
Ethylbenzene	<MDL	<MDL	NS	<MDL	<MDL	NS	<MDL	<MDL	NS	<MDL	<MDL	NS	0.0003 B,J	0.001	108
Xylene	<0.001	0.00063	145	<0.00147	0.00041 J	92.5	<MDL	<MDL	NS	<MDL	<MDL	NS	0.0004 B,J	0.001 B,J	85.7
TCL Pesticide Analysis, GC (8080) (mg/kg)															
All Pesticides	NA	NA	NS	NA	NA	NS	<MDL	<MDL	NS	<MDL	<MDL	NS	<MDL	<MDL	NS
TCL VOC Analysis, GC/MS (8240)															
Methylene Chloride	NA	NA	NS	NA	NA	NS	0.001	0.023	183	0.031 B	0.041 B	27.8	0.00490	0.00386	23.7
Xylenes	NA	NA	NS	NA	NA	NS	<MDL	<MDL	NS	0.006	0.009	40	<MDL	<MDL	NS

**TABLE 3-28A
(CONTINUED)**

Sample No.: Date:	F-21A 07/15/94	DUP001 07/15/94	RPD %	E-4A 08/02/94	DUP004 08/02/94	RPD %	B-04B 08/02/94	DUP005 08/02/94	RPD %	D-5B 08/02/94	DUP-008 08/02/94	RPD %	D33C 11/18/94	DUP010 11/18/94	RPD %
<i>RCRA TCLP Metals Analysis (mg/L)</i>															
Barium	NA	NA	NS	NA	NA	NS	1.065	1.031	3.3	1.09	0.979	10.6	NA	NA	NS
Lead	NA	NA	NS	NA	NA	NS	9.44	0.0088	7.2	0.00753	0.00966	24.8	NA	NA	NS

Notes:

F-21A: Fire Training Area Investigative Sample
E-4A: Separator Pit Outflow Swale Investigative Sample
B-04B: Monitoring Well Investigative Sample
D-5B: Separator Pit Floor Investigative Sample
D33C: Separator Pit Floor Confirmation Sample

$$RPD = \frac{|S_1 - S_2|}{[(S_1 + S_2)/2]} * 100$$

where S₁ and S₂ are analytical results for the sample of interest and its duplicate.

For discussion of Tables 3-28A, 3-28B, and 3-28C, refer to Section 3.4.1 of CCR, Vol. 1.

TABLE 3-28B

**QUALITY ASSURANCE DUPLICATE ANALYSIS
FORMER UST LOCATION CONFIRMATION SAMPLES
NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND
OHM PROJECT NO. 16006**

<i>Sample No.: Date:</i>	<i>T9EAST 10/31/94</i>	<i>DUP009 10/31/94</i>	<i>RPD %</i>	<i>T5BOT 11/19/94</i>	<i>DUP011 11/19/94</i>	<i>RPD %</i>	<i>T1-4W 01/10/95</i>	<i>DUPT1 01/10/95</i>	<i>RPD %</i>
<i>TPH, IR (418.1M) (mg/kg)</i>	11.90	13.00	8.46	<MDL	<MDL	NS	31	<18	>53

Notes:

For discussion of Tables 3-28A, 3-28B, and 3-28C, refer to Section 3.4.1 of CCR, Vol. 1.

$$RPD = \frac{|S_1 - S_2|}{[(S_1 + S_2)/2]} * 100$$

where S_1 and S_2 are analytical results for the sample of interest and its duplicate.

TABLE 3-28C

**QUALITY ASSURANCE DUPLICATE ANALYSIS
PESTICIDE-IMPACTED WETLAND AREA
NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND
OHM PROJECT NO. 16006**

Sample No.: Date:	H18A 07/20/94	DUP002 07/20/94	RPD %	H26A 07/20/94	DUP003 07/20/94	RPD %	H24B 08/03/94	DUP006 08/03/94	RPD %	H39A 08/03/94	DUP007 08/03/94	RPD %
<i>TCL Pesticide Analysis, GC (8080) (mg/kg)</i>												
Endosulfan I	0.25	<0.043	133.3	<MDL	<MDL	NS	<MDL	<MDL	NS	<MDL	<MDL	NS
4,4'-DDD	20.10	16.00	22.7	0.029	0.032	10.6	0.041	<MDL	165.3	<MDL	<MDL	NS
4,4'-DDE	27.00	2.00	172.4	1.730	1.670	3.5	<0.0214	0.432	39.7	<MDL	<MDL	NS
4,4'-DDT	37.40	4.13	160.2	0.031	0.065	70.0	<MDL	0.016 J	NS	<MDL	<MDL	NS

Sample No.: Date:	H43A 09/20/94	DUP 09/20/94	RPD %	H64C 01/06/95	DUP01H 01/06/95	RPD %	H54C2 01/25/95	DUP02H 01/25/95	RPD %
<i>TCL Pesticide Analysis, GC (8080) (mg/kg)</i>									
Endosulfan I	<MDL	<MDL	NS	<MDL	<MDL	NS	<MDL	<MDL	NS
4,4'-DDD	4.20	6.70	25.5	0.128	0.083	42.7	<MDL	<MDL	NS
4,4'-DDE	2.40	3.10	46.0	0.415	0.150	93.8	<MDL	<MDL	NS
4,4'-DDT	2.49	4.10	49.0	0.337	0.086	118.7	<MDL	<MDL	NS

Notes:

$$RPD = \frac{|S_1 - S_2|}{[(S_1 + S_2)/2]} * 100$$

where S_1 and S_2 are analytical results for the sample of interest and its duplicate.

For discussion of Tables 3-28A, 3-28B, and 3-28C, refer to Section 3.4.1 of CCR, Vol. 1.

ANALYTICAL SUMMARY TABLE 3-29

WATER TREATMENT INFLUENT/EFFLUENT SAMPLING AND ANALYSIS
NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND
OHM PROJECT NO. 16006

Sample No. Date:	WT092994I 09/29/94	WT092994E 09/29/94	WT100394I 10/03/94	WT100394E 10/03/94	WT100494I 10/04/94	WT100494E 10/04/94	WT100594I 10/05/94	WT100594E 10/05/94
TPH Analysis, IR (418.1M) (mg/L)								
Petroleum Hydrocarbons	1.84	0.164	0.734	NA	0.917	0.120	3.00	<0.100
BTEX VOC Analysis, GC (8020) (mg/L)								
Toluene	<0.001	<0.001	<0.001	<0.001	NA	<0.001	<0.001	<0.001
Xylene	0.002	<0.001	<0.001	<0.001	NA	<0.001	0.001	<0.001
TCL Pesticide Analysis, GC (8080)	ND	ND	ND	NA	NA	NA	NA	NA

Sample No. Date:	WT100694I 10/06/94	WT100694E 10/06/94	WT100794I 10/07/94	WT100774E 10/07/94	WT100894I 10/08/94	WT100894E 10/08/94	WT100994I 10/09/94	WT100994E 10/09/94
TPH Analysis, IR (418.1M) (mg/L)								
Petroleum Hydrocarbons	0.705	0.351	0.812	0.285	0.615	0.246	13.1	0.928
BTEX VOC Analysis, GC (8020) (mg/L)								
Toluene	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001
Xylene	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.006	0.001
TCL Pesticide Analysis, GC (8080)	NA	NA	NA	NA	NA	NA	NA	NA

**TABLE 3-29
(CONTINUED)**

<i>Sample No. Date:</i>	<i>WT101094I 10/10/94</i>	<i>WT101094E 10/10/94</i>	<i>WT101794I 10/17/94</i>	<i>WT101794E 10/17/94</i>	<i>WT101894I 10/18/94</i>	<i>WT101894E 10/18/94</i>	<i>WT102094I 10/20/94</i>	<i>WT102094E 10/20/94</i>
<i>TPH Analysis, IR (418.1M) (mg/L)</i>								
Petroleum Hydrocarbons	7.75	0.461	0.648	0.115	0.411	<0.100	0.831	0.215
<i>BTEX VOC Analysis, GC (8020) (mg/L)</i>								
Toluene	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	NA	<0.001
Xylene	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	NA	<0.001
<i>TCL Pesticide Analysis, GC (8080)</i>	NA	NA	ND	ND	NA	NA	NA	NA

<i>Sample No. Date:</i>	<i>WT102194I 10/21/94</i>	<i>WT102194E 10/21/94</i>	<i>WT102594I 10/25/94</i>	<i>WT102594E 10/25/94</i>	<i>WT102694I 10/26/94</i>	<i>WT102694E 10/26/94</i>	<i>WT102794I 10/27/94</i>	<i>WT102794E 10/27/94</i>
<i>TPH Analysis, IR (418.1M) (mg/L)</i>								
Petroleum Hydrocarbons	1.44	0.285	0.870	0.291	0.505	0.301	0.790	0.202
<i>BTEX VOC Analysis, GC (8020) (mg/L)</i>								
Toluene	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylene	0.008	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
<i>TCL Pesticide Analysis, GC (8080)</i>	NA	NA	ND	ND	NA	NA	NA	NA

**TABLE 3-29
(CONTINUED)**

<i>Sample No. Date:</i>	<i>WT102894I 10/28/94</i>	<i>WT102894E 10/28/94</i>	<i>WT110894I 11/08/94</i>	<i>WT110894E 11/08/94</i>	<i>WT111994I 11/19/94</i>	<i>WT111994E 11/19/94</i>	<i>TRPBLK 11/19/94</i>
<i>TPH Analysis, IR (418.1M) (mg/L)</i>							
Petroleum Hydrocarbons	0.230	0.137	<0.500	<0.500	NA(1)	NA(1)	NA
<i>Halogenated VOC Analysis, GC (8010) (mg/L)</i>							
Methylene Chloride	NA	NA	NA	NA	0.0065 B	0.0064 B	0.0066
Vinyl Chloride	NA	NA	NA	NA	0.0029	<0.002 B	<0.002
<i>BTEX VOC Analysis, GC (8020) (mg/L)</i>							
Toluene	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA
Xylene	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	NA
<i>TCL Pesticide Analysis, GC (8080)</i>	NA	NA	ND	ND	ND	ND	NA

Notes:

TPH results for Samples WT111994I and WT111994E were rejected during laboratory QC due to laboratory contamination.

**TABLE 3-29
(CONTINUED)**

<i>Sample No.: Date:</i>	<i>WT120894I 12/08/94</i>	<i>WT120894E 12/08/94</i>	<i>TRPBLK 12/08/94</i>
<i>TPH Analysis, IR (418.1M) (mg/L)</i>			
Petroleum Hydrocarbons	2	<1	NA
<i>Halogenated VOC Analysis, GC (8010) (mg/L)</i>	<MDL		
<i>BTEX VOC Analysis, GC (8020) (mg/L)</i>			
Toluene	<0.001	<0.001	<0.001
Xylene	<0.003	<0.003	<0.001
<i>TCL Pesticide Analysis, GC (8080) (mg/L)</i>			
delta-BIIC	0.000059	<0.00005	NA
Endosulfan Sulfate	0.00011	<0.00005	NA

Note:

For discussion of Table 3-29, refer to Section 3.4.2 of CCR, Vol. 1.

TABLE 3-30

**PAINT FILTER TEST SUMMARY TABLE
SITE 2: SEPARATOR PIT AND OUTFLOW DITCH
NAVAL TRAINING CENTER - BAINBRIDGE, MARYLAND
OHM PROJECT NO. 16006**

<i>Date</i>	<i>Location</i>	<i>No. of Tests</i>	<i>Pass/Fail</i>
09/29/94	Separator Pit	2	Pass
09/30/94	Separator Pit	5	Pass
10/04/94	Outflow Trench	1	Pass
10/07/94	Separator Pit	11	Pass
10/08/94	Separator Pit	37	Pass
10/09/94	Separator Pit	20	Pass
10/10/94	Separator Pit	15	Pass
10/11/94	Separator Pit	13	Pass
10/12/94	Separator Pit	14	Pass
10/13/94	Separator Pit	10	Pass
10/14/94	Separator Pit	13	Pass

Notes:

All tests conducted by G. MacEvoy and D. Burkett, OHM Remediation Services Corp.

For discussion of Table 3-30, refer to Section 3.4.3 of CCR, Vol. 1.